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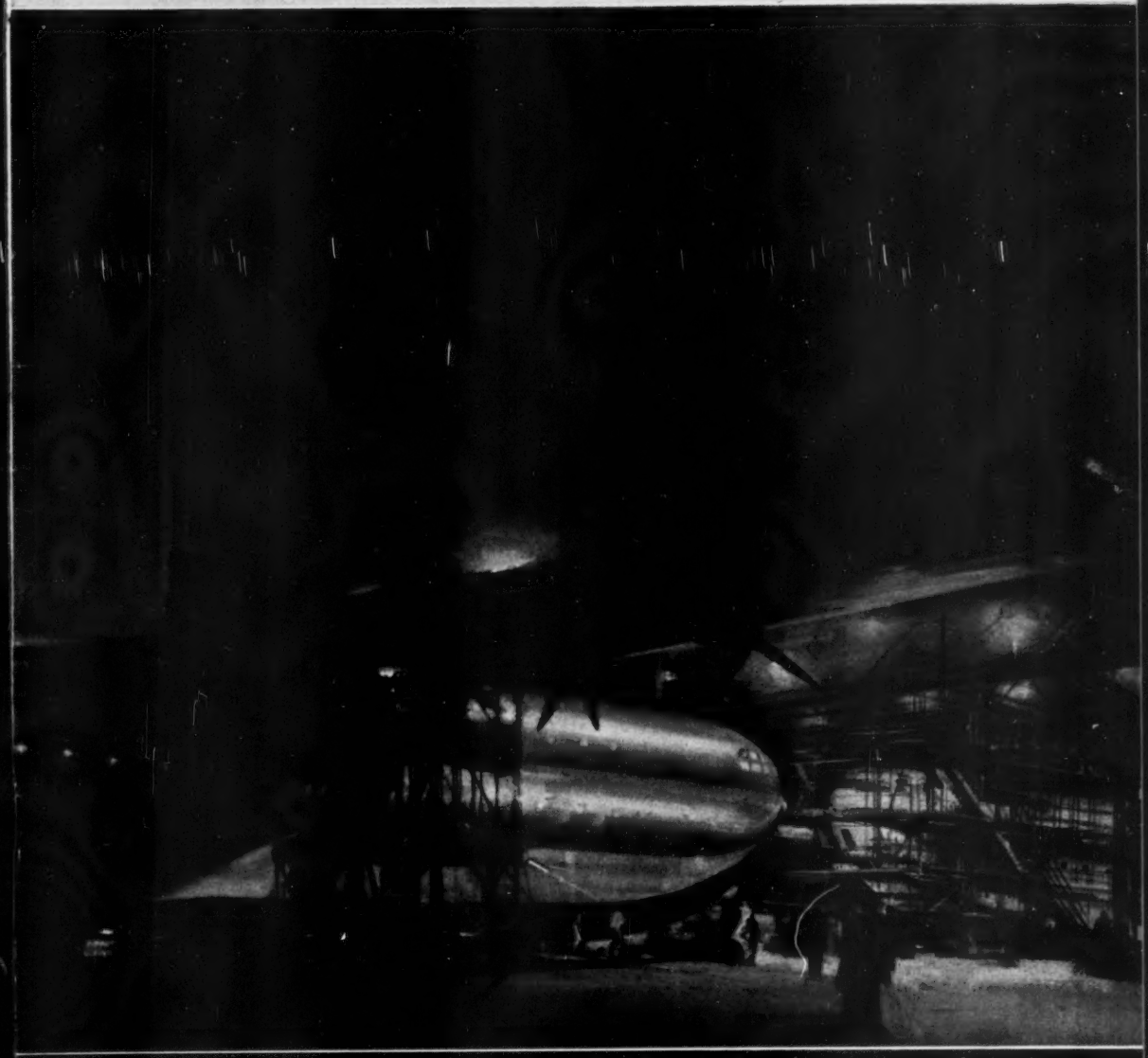

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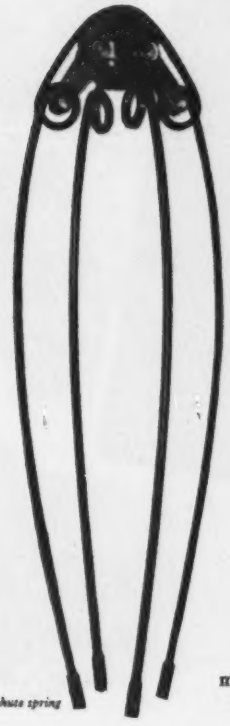

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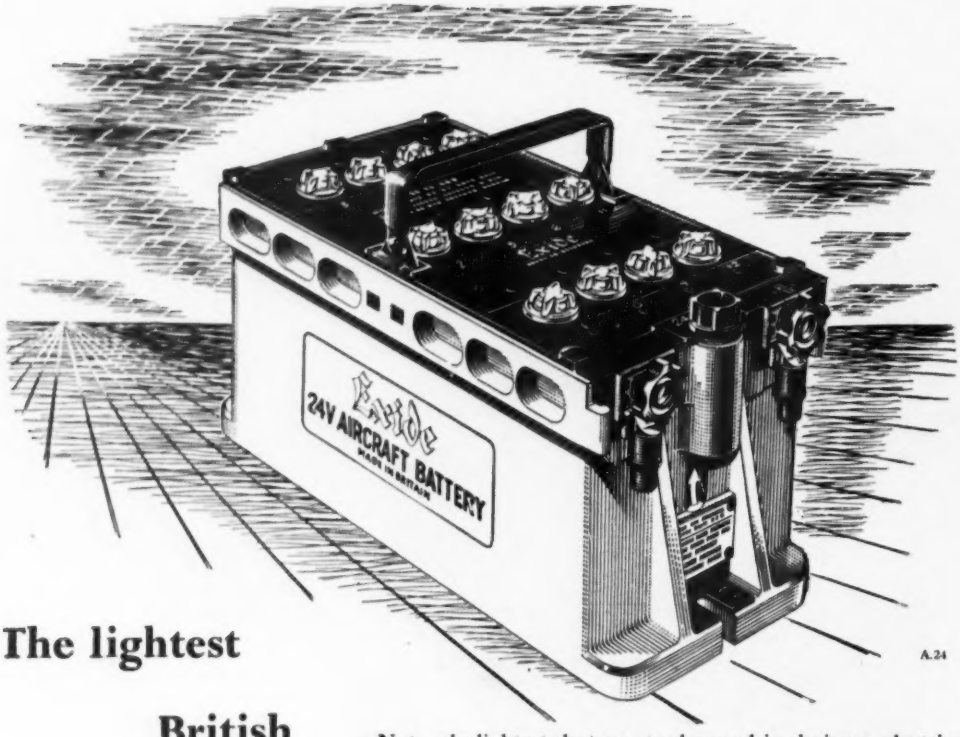

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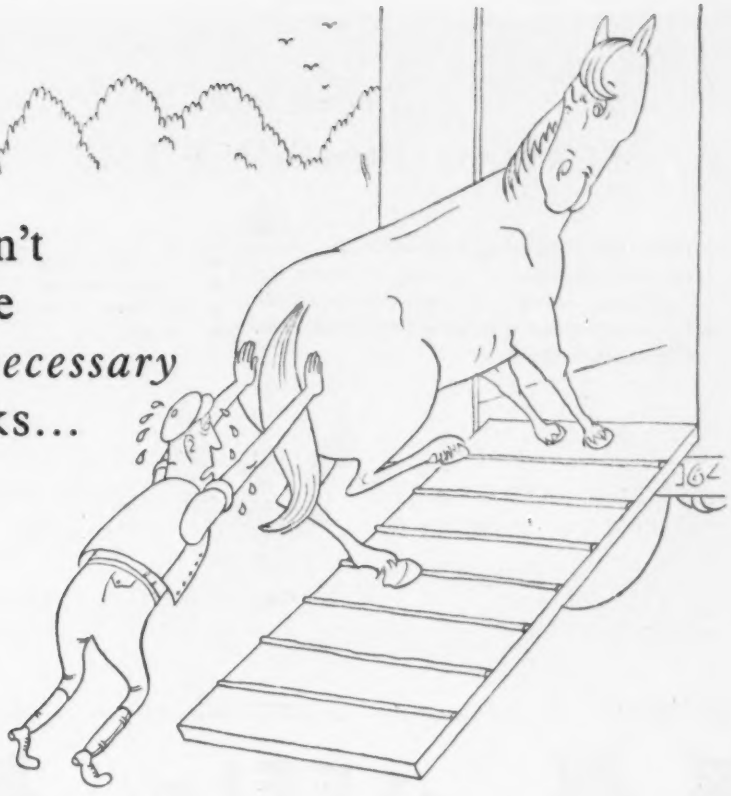

We *do* get a kick out of taking unnecessary risks . . . but is it worth it? Wouldn't it be *so* much better if we gave it a little more thought in the first place? So often it's too late to do anything about it — the risk is taken, the damage is done — and there we are, all up in the air and wondering what to do next. It's no consolation to know that everybody's doing it — someone or other somewhere or other is taking needless risks every day, every month, every season; and speaking of seasons, let's talk about a very superior Spring . . .

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EDITOR
MAURICE A. SMITH, D.F.C.

ASSISTANT EDITOR
H. F. KING, M.B.E.

TECHNICAL EDITOR
C. B. BAILEY-WATSON, B.A.

ART EDITOR
JOHN YOXALL

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Exhibition Site

WE are glad to see that B.E.A. are making a series of test flights into the South Bank Site with their helicopters and especially pleased to learn that noise appears on the list of items to be checked to ascertain the suitability of the site for use as a London rotor station. Regular readers will, no doubt, recall that for many months past we have been campaigning on the helicopter's behalf; in the March 21st issue, at a time when questions regarding the speeding-up of their development were being asked in the House, we expressed our fear that the helicopter might be allowed to become another of the "too lates and too fews." We have also felt it necessary to say something about noise and helicopters, for not only do they produce a penetrating buzz for most of their time in the air, together with a pulsating note from the exhaust, intensified by rotor-blade echoes, but they usually fly low and "hang about" for a relatively long time over their landing areas.

The probability is that these South Bank tests will provide very little information that is not already well known to the Helicopter Unit, but they do represent activity, practice and another step in the education of the public in preparation for helicopter services which it is hoped are not now many years distant. The same can be said of the current virtually non-productive run between London and Birmingham.

It does not require flights in and out of the South Bank site to prove that experienced pilots can land a helicopter there, nor need they be made to discover that at the moment it is a rather bad site from the pilot's point of view. To put a single-engined helicopter down in a confined space surrounded by buildings and obstructions must always entail some risk, not so much to life and limb, but to the aircraft itself. As to whether the position of the site near Waterloo Station is convenient for potential passengers, there is again little to learn from making flights in and out.

In spite of these remarks, however, we do not doubt the pilots are quite glad to have a go; and, as we have said, anything to add to the Unit's experience against the day when it must expand enormously is to be favoured. In this connection we may add that the Unit's pilots, who are normally kept busy enough, are now also starting to instruct R.A.F. pilots in the art of rotorplane flying.

Because helicopters skilfully flown can make vertical descents or climbs to land on or take off from small platforms, it is not to say that a clear approach or climb with forward speed and into wind are not both advantageous and desirable. Should the South Bank site be selected for a rotor station for the services which B.E.A. plan (using twin-engined helicopters) for two to three years from now, then everything would be done to improve it and to make it as safe as possible; the proximity of the river is certainly an important advantage. We understand, incidentally, that W/C. Brie, who is in charge of the Helicopter Unit and who is playing the part of an airborne observer during the series of tests, pointed out the advantages of a landing platform on the river for rotating-wing aircraft even in pre-war days. After his first landing last Monday he remarked, guardedly, that the site had possibilities. A photograph appears on page 135.

We may next turn again to the matter of noise, the level of which is to be measured and the irritation it may cause, judged in the House itself and in the County Hall beside the site. Of all the piston-engined aircraft flying today the helicopter is probably the easiest to silence to the point where it would pass unnoticed among the other sounds of a city. If the requirement were there, the designers could do it. By this we mean that the cost and weight, and perhaps drag and power loss—none very large—will not be inflicted upon the helicopter until a customer insists upon silence; we hope B.E.A. will do so. It is most important from the psychological viewpoint that a new form of transport be well received by the public. A good silencing system incorporated in the initial designs of proposed commercial helicopters may well result in a much better reception both from the public who might fly in them and those over whom they will fly. It would also help to ensure a quiet cabin for the confirmed passengers—one ingredient of comfort which they have now been educated to expect.

Selecting a Military Aircraft

—*Forty Years Ago: Memories of Salisbury Plain Before the Days of "Security"*

By GEOFFREY DORMAN, A.R.Ae.S.

FORTY years ago to the day, the War Office Military Aeroplane Competition began at Larkhill, on Salisbury Plain. The results were hardly decisive in their object, but the contest produced some noteworthy aircraft and incidents, recalled in this article.

THE recent trials to decide whether the Gloster G.A.5 or the D.H.110 was to be put into large-scale production for the R.A.F. were conducted behind a curtain of rigid security. No unauthorized people were permitted to watch them, and when the decision was made the bare fact was announced that the Gloster delta had won. It will be many months or even years before we are told the performance of either aircraft.

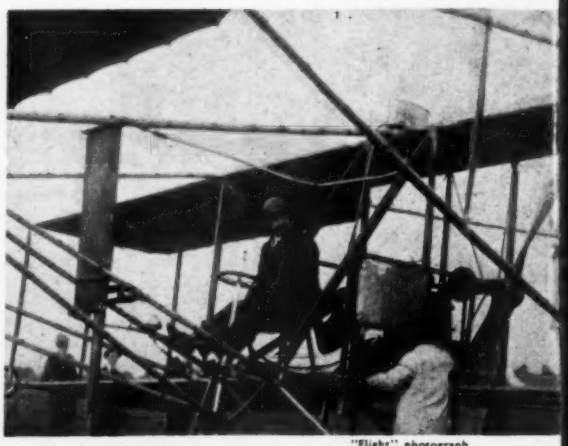
It was not always thus. Late in 1911 the War Office announced that a competition, open to the aircraft manufacturers of the whole world, would be held to decide which was the most suitable aeroplane to equip the Royal Flying Corps that was to come into existence on April 13th, 1912. There were prizes amounting to £10,000, from which sum £4,000 would be awarded to the most successful manufacturer of any nationality, and £1,500 to the most successful whose machine, with the exception of the engine, was British built. There were second and third prizes in each class, and consolation prizes. The event was officially called the War Office Military Aeroplane Competition, but was usually referred to as the Military Trials.

The Trials were held at Lark Hill (nowadays generally spelt "Larkhill") on Salisbury Plain, during August 1912; they started on August 1st and continued until the 27th, interrupted occasionally by bad weather. The criticism was made that the competitors did not fly in weather in which pilots of the R.F.C. flew; but the critics overlooked the fact that damaged Service machines would be repaired in due course at Government expense, whereas if a competing machine crashed it might be out of the contest for some days, or even altogether, and thus the entrant would lose the chance of winning big prize-money.

The performances of every aircraft were recorded week by week in *Flight*, and before the end of August the War Office announced all the prizewinners. The first prize of £4,000 in the international class was awarded to S. F. Cody, who also won the first prize open to British subjects. Cody was an American who had assumed British nationality in October 1909.

Many other famous pilots took part, of whom those still known to be living are T. O. M. Sopwith, C. H. Pixton, S. V. Sippe, F. P. Raynham, E. C. Gordon England, and Maurice Prévost. The Australian Harry Busteed may be living in Australia, though I have not heard of him for many years. Others who flew, with varying success, were R. L. Charteris, James Valentine, Jules Védrines, Lt. J. C. Porte, R.N., M. Moineau, W. B. Rhodes-Moorhouse (to be the first R.F.C. pilot to win the V.C.), J. Bielovucic, G. Perreyon, M. Chamenois, Gustav Hamel, and L. F. Macdonald. There was Gordon Bell, the stammerer of whom there are so many good stories; R. C. Fenwick, who was killed during the Trials; Pierre Verrier, a famous Maurice Farman pilot at Hendon; Lts. Bier and Von Blaschke, who were Austrians; and Edward Petre (to lose his life a few months later), brother of Henry Petre, who is still a pilot.

Thirty-two aircraft were entered. There were four from the British and Colonial Aeroplane Co., Ltd., which was renamed the Bristol Aeroplane Co., Ltd., in 1919. Two machines each were entered by: Hanriot (England), Ltd., a British branch of a famous French firm; A. V. Roe and Co., Ltd.; Bréguet of France; Coventry Ordnance Works, Ltd., from which the English Electric Co., Ltd., derives; British Deperdussin Co., Ltd., British branch of the French firm; Armand Deperdussin, head of the French firm; and S. F. Cody. One aeroplane each was entered by: Vickers, Ltd.; L. Howard Flanders, Ltd.; Martin and Handasyde Ltd., later known as Martinsyde, Ltd.; Aerial Wheel Syndicate, Ltd.; C. E. King; Jacob Lohner and Co. of Austria; A. M. Harper; Piggott Bros. and Co., Ltd.; Handley Page, Ltd.; and Société Anon. des Aeroplanes Borel.



"Flight" photograph

S. F. Cody in the Cody biplane (120 h.p. Austro-Daimler), who won the two principal prizes in the competition. Note the rather crude-looking bamboo booms for the forward elevator, in contrast to the quite modern appearence of the faired interplane struts.

There was a committee of judges; its chairman was Brigadier (later Sir David) Henderson, who was Director of Military Training and was to command the R.F.C.; Capt. Godfrey Paine, R.N., who was Commandant of the C.F.S.; Maj. (later Maj.-Gen. Sir F. H.) Sykes, Commandant of the Military Wing, R.F.C.; and Mervyn O'Gorman, who was Superintendent of the Royal Aircraft Factory. Harold Perrin, secretary of the R.Ae.C., acted as general factotum to this committee.

Everyone in the aircraft industry who could do so went to Lark Hill to watch the Trials. The public were freely admitted, except into the sheds; and a good time was had by all, for this was the first of the famous "get-togethers" of the aeronautical community, and they filled the local inns, hotels and pubs during this holiday August. For some of the time I was a cadet in the Public Schools O.T.C. camp at Tidworth Pennings nearby, at which a fellow-cadet was Sgt. W. S. Douglas, who is now Marshal of the Royal Air Force Lord Douglas of Kirtleside. During the time we spent in camp we several times marched over the Plain to Lark Hill to watch the flying, and the competing aeroplanes often flew over our lines. Cody landed one early morning not far from the tents and was at once over-run by a swarm of small boys, of whom I was one. Soon he was picking boys off the wings with his usual good humour and urging us not to touch the propeller and other vital parts—especially what he called the "electrickery and magnuisance."

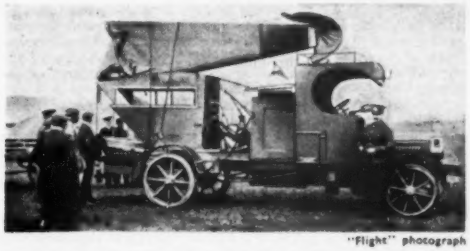
During the event Cody worked like a Trojan, with just a few helpers from his immediate family, and a youth named Duncan Davies, who later was to form the famous Brooklands School of Flying. Cody won by superhuman physical energy (though he was already turned fifty), and by his dominating personality.

The most novel aeroplane in the Trials was unquestionably the Avro biplane, with a 60 h.p. Green engine. Pilot and passenger sat inside a cabin—as they were to do again years later, when the Puss Moth set a "new" fashion in 1929. The

Avro "All-enclosed limousine biplane," as it was called, was the first cabin aeroplane to fly.

The judges had to be satisfied that certain similar parts on any aeroplane were interchangeable, and that a pilot and observer could be carried, either of whom could use the controls from their seats. Before proceeding with the competition, entrants had to prove that their machines could (*a*) carry a live load of 250 lb, in addition to instruments, and fuel and oil for 4½ hours; (*b*) could fly for three hours loaded with specified equipment; (*c*) could climb to 4,500ft and maintain a height of 1,500ft for one hour; (*d*) could climb at not less than 200ft/min for the first 1,000ft; (*e*) fly at a maximum speed of not less than 55 m.p.h. Having fullfilled these "preliminary conditions," each entrant had to prove that his machine could : (*a*) "plane" down from not more than 1,000ft in a calm with engine stopped, during which a horizontal distance of 6,000ft must be covered without touching the ground; (*b*) rise without damage from long grass, clover, or harrowed land, fully loaded, in a calm; (*c*) land on cultivated ground, including plough, and pull up within 75 yards when landing on smooth turf in a calm; (*d*) be steered at low speed on the ground in a calm; (*e*) be

The Avro "All-enclosed limousine" (60 h.p. Green), the first cabin aeroplane—and, as the author of this article relates, the first machine to recover successfully from a spin; the feat was achieved by Lt. Wilfred Parke, R.N., at the Military Trials. (Below) The cabin and tail of the Avro after the crash which it suffered during the first week of the contest; it was rebuilt and competing again, within a week.



"Flight" photograph

capable of being changed from flying trim to road-transport trim (maximum width, 10ft) and travel on its own wheels, or on trolleys, along a road; (*f*) offer the pilot and observer a view as open as possible, while shielding them from the wind and allowing them to communicate with each other. There were also about a dozen more "desirable attributes" for which extra marks would be awarded.

As already stated, the first prize in the Open Class, £4,000, went to S. F. Cody for his Cody biplane with 120 h.p. Austro-Daimler engine, who was also awarded the first prize in the all-British class. The first prize in that class was £1,500, but it had been ruled that no competitor could win more than £5,000 in all, so the additional prize was reduced to £1,000.

Cody had built a tractor monoplane, which he had entered also, but shortly before the Trials, when the constructor was making a test flight at Farnborough, a cow had got in the way of his landing approach. The monoplane was smashed too badly for Cody's limited resources to allow its repair in time; as for the cow, it perished in an aura of publicity.

The second prize of £2,000 in the open class went to Armand Deperdussin for the French-built Deperdussin monoplane flown by Maurice Prévost, who, a few months, later, was to become the first winner of the Schneider Trophy.

As no British machines other than Cody's completed all the tests the two second prizes of £1,000 each in that class were withheld; but three awards of £500 each went to the

"Flight" photograph

The French "Dep," which secured the second prize, of £2,000, taking off from ploughland—one of the tests which would tax an aircraft of today.

British-built Deperdussin flown by Lt. John Porte, R.N., and two Bristol monoplanes flown respectively by Harry Busteed and by Howard Pixton, who won the second Schneider Trophy in 1914.

The following six aircraft which were submitted to all tests were awarded consolation prizes of £100 : Two French-built Hanriot monoplanes, flown by the Peruvian Bielovucic and the Englishman S. V. Sippe; a Maurice Farman "Long-horn" (as it was subsequently named by the R.F.C.), flown by the Frenchman Pierre Verrier and entered by George Holt Thomas, founder of the Aircraft Manufacturing Co., Ltd.; two French Blériot monoplanes, both flown by Blériot's chief pilot, Perryon; and the all-enclosed Avro, the only completely British aircraft and engine to complete the tests, flown by Lt. Wilfred Parke, R.N.

This last-named machine performed the most sensational act of the whole meeting. During the first week it was badly crashed, the fuselage being broken in halves. It was rushed back to the Avro factory at Brownsfield Mills, Manchester, where it was completely rebuilt, brought back to the Plain by road and was flying again in eight days.

Then, on Sunday morning, August 25th, Parke, with Lt. Le Breton, R.F.C., as passenger, went out at daybreak to carry out the three-hour test. When he had completed it he flew over Lark Hill at a height of about 600 or 700ft in a wind of about 15 m.p.h. and began a spiral glide to land. At once the glide became a steep spiral dive, and in a second or two the machine was out of control. More by luck than intention Parke centred the controls and gave opposite rudder, regaining mastery only a few feet above the ground. He had got the machine into (and recovered from) an accidental spin, about which nothing was then known—except that previous instances had always ended fatally.

(*Concluded at foot of page 117*)

Verrier, in the Aircraft Company's Maurice Fairman, passing over the hangars in—as a "Flight" caption emphasized—a 25 m.p.h. wind.

"Flight" photograph

SEA RANGER: One of the first flight views of the Avro Shackleton M.R.2 (four Rolls-Royce Griffons), which has mountings for two 20 mm guns in the redesigned nose, a ventral scanner, and a faired-off tail, with lookout position.

FROM ALL QUARTERS

George Medal for Bill Waterton

BEYOND the call of duty—a familiar phrase—has seldom been applied more appropriately than to the actions of S/L. William Arthur Waterton, A.F.C., chief test pilot of the Gloster Aircraft Company, who was last Tuesday awarded the George Medal for his attempt to land the prototype G.A.5 super-priority delta fighter after the elevators had been carried away. According to the citation, S/L. Waterton, knowing that a crash would seriously put back the development and production of the G.A.5, decided to land, although he had an ejector seat and parachute.

While the aircraft was travelling at high speed, elevator flutter started and both surfaces became detached, leaving the pilot with practically no control of his aircraft in pitch. He climbed to 10,000ft, experimented, and found it possible to obtain some control down to a speed half as fast again as the normal landing speed. He let down and succeeded in landing, though heavily; the undercarriage gave way, fire broke out, and he was only able to free himself with great difficulty. Presumably the control which remained was that afforded by the variable-incidence tailplane. The power and rate of change provided by such a trimming control would be too slow to permit anything like a normal landing.

New French Air Attaché

THE popular French Air Attaché in London, Commandant R. Derimay, was due to end his tour of duty in that post yesterday. His successor is Cdt. Louis Jacques Andlauer, whose war record will have made him known to many who were serving in the Royal Air Force at the time. From 1940 to 1942 he was working with the Resistance Movement, picking landing fields for Lysanders; then he came to England and served with No. 88 Squadron and No. 342 Lorraine Group. Returning to his native country at the time of the invasion, he commanded a transport squadron and later became an instructor at the Fighter School at Meknes, in North Africa. He was then, for eighteen months, assistant to the Commandant of the Liaison Group at Fontainebleau. With 2,500 hr flying, he holds the Legion d'Honneur, Croix de Libération, Croix de Guerre, Médaille de la Résistance, and D.F.C.

The Cirrus Autocar

THE above new designation applies to the Auster J.5G, powered with a Cirrus Major III of 155 h.p. and possessing a higher performance than the now-familiar Gipsy Major version. The aircraft (picture, page 118) is specially recommended for operation from high-altitude airfields and in tropical climates. A spray load of 70 gallons, or a dust load of 700 lb, can readily be carried.

A floatplane version will be available, but the following figures apply to the landplane at full load: maximum speed, 127 m.p.h.; cruising speed, 110 m.p.h.; stalling speed (with flaps), 36 m.p.h. I.A.S.; landing run (5 m.p.h. wind), 130 yd; take-off run (5 m.p.h. wind), 175 yd; still-air range, 485 miles; service ceiling, 14,000ft.

Russian Gas-Turbine Alloys

IN the description of the Russian variant of the Rolls-Royce Nene given last week it was stated that "Nimonic 80 and 75 have, apparently, been produced in Russia. . . ." This statement should, perhaps, be amplified by pointing out that, although the Russian alloys are compositionally similar to these Nimonics they have not been produced, or fabricated, with the gradually acquired techniques of Henry Wiggin and Sons, Ltd.

It is now twelve years since the first creep-resisting Ni-Cr-base alloys were evolved by the Mond Nickel Company's laboratories. Since that time alloys have been developed with progressively improved properties, requiring a parallel development in manufacturing technique. It may be assumed that the practical "know-how" of the working of these advanced alloys has not yet been acquired by Russia, nor has that country obtained any of the many newer and better Nimonics, of which Nimonic 80A, 90 and 95 may be named. The last named is an entirely new material.

J. R. B. Hartnoll

WE regret to have to record the death of Mr. J. R. B. Hartnoll, of Photo Flight, Ltd., as a result of a flying accident which occurred on Thursday of last week. Born in 1914, and educated at Harrow and University College, Oxford, he learned to fly with the Wiltshire Club in 1936, and soon afterwards joined the R.A.F. Shortly before the war he went to the de Havilland Company, but was called up as a member of the R.A.F.O. and posted as an instructor to No. 3 F.T.S., South Cerney. In 1941 he was seconded to de Havillands as a test pilot. He flew for their Propeller Division until the end of the war, and carried out the initial development flying of the first D.H. braking airscrews. After a short period at the end of the war in the D.H. engine-installation department, he started Photo Flight, Ltd., at Elstree, in 1948. He was now able to combine his interests in aviation and photography, and to specialize in commercial air photographs of high quality.

Mr. Hartnoll lost his life when a light aircraft—in which he was returning from photographing a factory in Wiltshire—dived into the ground near Booker airfield, for some reason as yet unexplained. He leaves a widow and three sons.

WORLD PREMIERE: Honouring the inaugural showing of "The Sound Barrier," reviewed on p. 134, is H.R.H. the Duchess of Gloucester, who may be learning something of the Vickers Supermarine Swift—displayed in model form—from its designer, Mr. J. Smith.

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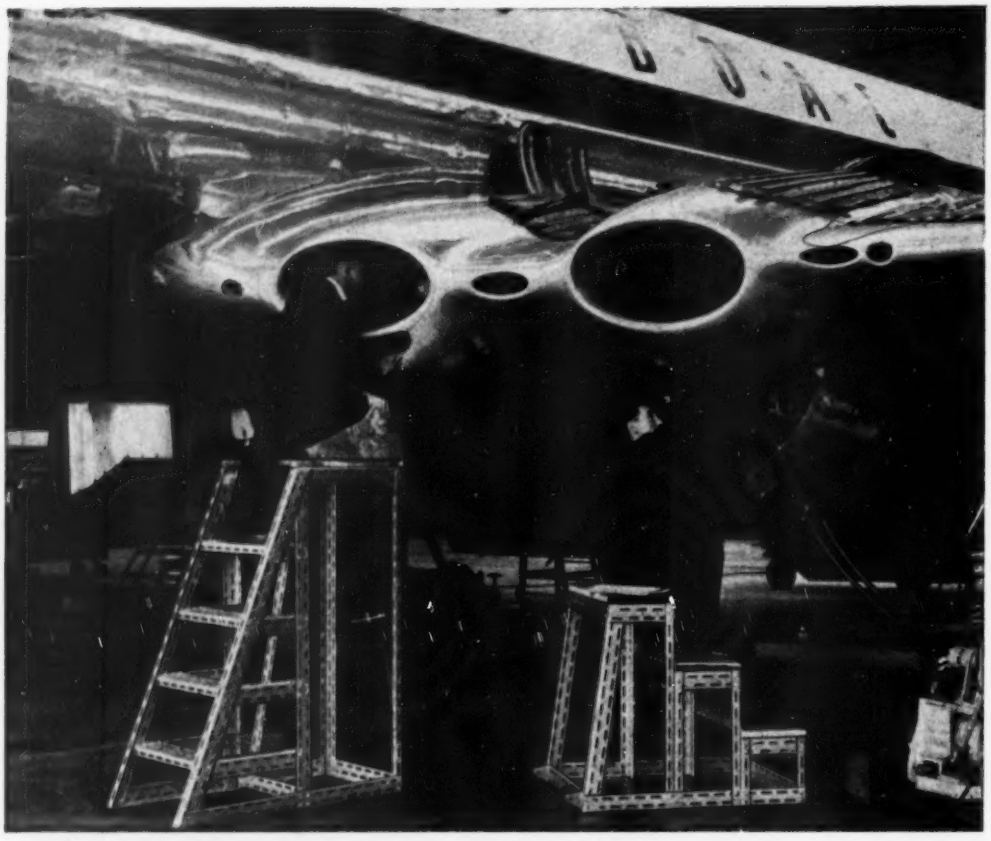

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FROM ALL QUARTERS . . .

New Decca Chain

THE south-west British chain of Decca Navigator stations has been built principally to meet the needs of shipping; it will aid all craft in the South-western Approaches and should enable accurate landfalls to be made in all weathers. But there are many important airfields in the area covered by this chain—which reaches from Southern Ireland to well inside France—and aircraft will also benefit from its operation.

Geographically, this new chain follows the usual star pattern, the master station being near Plymouth and the slaves being sited on St. Mary Island in the Scillies (Green), in Jersey (Red), and at Llancarffan, near Cardiff (Purple). The official opening was performed on July 29th by Sir Norman Guttery, K.B.E., C.B., Deputy Secretary, Ministry of Transport, at a ceremony aboard M.V. *Vecta*, steaming from Southampton to Poole Bay.

Cause for Congratulation

CONGRATULATIONS are due to Capt. R. C. O. Lovelock, D.F.C., of Airwork, Ltd., on a skilful forced landing which he executed with a Hermes IV in a field near Pithiviers, south of Paris, on July 23rd. The aircraft was flying on a trooping service from Blackbushe to Malta, and had 54 soldiers and six aircrew on board.

It appears that the starboard outer engine lost its airscrew, in process of which the starboard inner was also put out of action. Capt. Lovelock put the aircraft down, and all its occupants were able to escape before it caught fire and was burnt out. In stating that only three of them received injuries, which were of a minor nature, Airwork express the view that this fortunate outcome may well have been due to the fact that the cabin of the Hermes was fitted throughout with rearward-facing seats.

The troops were flown back to London, and re-kitted, a few days later.

Facing Aft

WHATEVER reasons may be preventing others from coming to a decision on rearward-facing seats, the U.S.A.F. has tried the layout and found its advantages sufficient to justify its adoption. In fact, under a new requirement of the Military Air Transport Service, all future American Service transports will be equipped with rearward-facing seats and present equipment is being modified to the same configuration. The first new transport to be delivered under these rules will be the Convair C-131, a variant of the CV-240, scheduled to join M.A.T.S. early next year; like most airliners today, the C-131 will take a leaf out of B.O.A.C.'s book in having a white-painted cabin-top.

Pruning and Forcing

THE American Aircraft Production Board has now reported to the U.S. Air Force and Navy its findings of a recent survey of types currently in, or scheduled for, production. It recommends that building of the following aircraft should be cut back, or stopped altogether: Grumman F9F Panther and Cougar; Lockheed F-94C Starfire; Martin B-57A Canberra; Northrop F-89 Scorpion; and Republic F-84G. In place of these types the following are suggested: McDonnell F2H-3 Banshee, itself to be replaced by the F3H—which may also cut out any requirement for the new Grumman F10F Jaguar; North American F-86F, to be replaced by the N.A. F-100 supersonic fighter; Douglas B-66, RB-66 and Navy A3D—variants of a basic design, stated to be superior to any similar aircraft; North American F-86D, to be eventually replaced by the Convair F-102 supersonic "automatic" delta; and Republic F-84F and RF-84F.

Other suggestions are the boosting of Boeing B-52 production at the expense of other long-range bombers; the replacement of the big Douglas F3D Skyknight by the tiny F4D Skyray (see picture on p. 118) earlier than expected; the hurrying into production of the Douglas A2D turboprop attack aircraft; the maintenance of Boeing B-47B and B-47C output at the present impressive rate; and the cancellation of all piston-engine contracts as soon as turboprops can be substituted.

Industry Recruitment Improves

OFFICIAL figures recently issued show that employment in the "Manufacture and Repair of Aircraft" reached 189,100 at the end of April, an encouraging increase of 2,600 from the previous month. The average rate of intake from November, 1951, has averaged nearly 2,800 a month or about 34,000 a year. When the "super-priority" scheme was announced in March this year, an official statement was made that 75,000 more workers were needed by early 1955 to meet our peak production needs.

		Men	Women	Total	Monthly Loss/Gain
1951	January ...	134,100	23,000	157,100	+3,500
	February ...	135,800	23,500	159,300	+2,200
	March	137,000	23,600	160,600	+1,300
	April	138,000	23,900	161,900	+1,300
	May	138,740	24,550	163,290	+1,390
	June	138,800	24,600	163,400	+ 110
	July	139,600	24,700	164,300	+ 900
	August ...	141,100	25,100	166,200	+1,900
	September ...	143,600	25,900	169,500	+3,300
	October ...	145,800	26,700	172,500	+3,000
	November ...	147,300	27,000	174,300	+1,800
	December ...	149,600	27,400	177,000	+2,700
1952	January ...	151,500	27,900	179,400	+2,400
	February ...	155,600	28,500	184,100	+4,700
	March	157,700	28,800	186,500	+2,400
	April	159,800	29,300	189,100	+2,600

SELECTING A MILITARY AIRCRAFT (Concluded from page 115)

On landing Parke was able to give an intelligent account of what happened, though he and his passenger, as well as those on the ground, were understandably shaken by the experience. A. E. Berriman, technical editor of *Flight*, was on the spot and, alone among the air correspondents present, realized the full implications of the incident. In the issue for August 31st he devoted to it two full pages with diagrams, and a full-page G.A. drawing of the machine (for such drawings *Flight* was even then justly renowned), explaining how the Avro had got into the predicament, and how Parke had managed to regain control.

"Parke's nose-dive," as it became known, was the beginning of the laying of the spin bogy; and it was not long after this that the phenomenon became more fully understood and pilots could spin intentionally and regain control. Wilfred Parke, by this contribution to flying knowledge, should have a secure place in aviation history. He lost his life on December 15th of the same year, in an encounter with another unknown force, when he got into the down-draught on the lee side of a hill in a Handley Page monoplane near Wembley.

The final results of the Trials showed that Cody's top speed was 72.4 m.p.h. and his minimum speed was 48.5 m.p.h., a very good speed range for those days. He was able to stop on the grass surface after running only 30 yd, and took off from harrowed ground in 320 yd. His gliding speed at an angle of 1 in 6 was 59.2 m.p.h. He dismantled his biplane to road trim in 21 min and reassembled it to flying trim in 30 min with five persons to help him.

The best performance in windy conditions was by Howard Pixton, in a Bristol monoplane with 80 h.p. Gnome engine, who flew for 15 min in a wind measured as 44 m.p.h. maximum and 17 m.p.h. minimum.

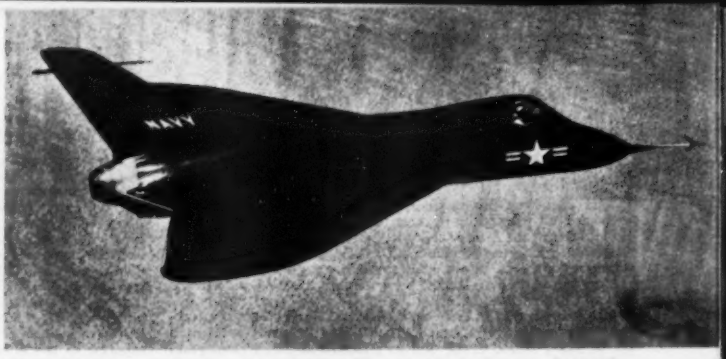
Perhaps it is something of an anti-climax to have to record that the competition did not, after all, directly produce any suitable aircraft for the R.F.C. The Cody aeroplane was never a success. A model, bought for the R.F.C. as the result of the Trials, killed its pilot, Lt. L. C. Rogers-Harrison, at Farnborough on April 28th, 1913; and on August 7th, 1913, Cody was himself killed at Farnborough, with W. H. B. Evans, a well-known Hampshire County cricketer.

Mr. (now Sir Geoffrey) de Havilland, who was chief designer to the Royal Aircraft Factory at Farnborough (then known as the R.A.F. and now as the R.A.E.), studied the rules carefully and designed a biplane which could fulfil most of the requirements of the Trials rather better than the competing aircraft, though it could not comply with some which D.H. thought were silly and unnecessary. Being the employee of the Government, D.H. was not eligible to compete, but his aeroplane, the first B.E., was agreed to be the best military design yet seen. The B.E. was later developed by Harry Folland and E. T. Busk into the B.E.2c, which, with the B.E.2d, B.E.2e, R.E.7 and R.E.8 were extensively used by the R.F.C. in the 1914-18 war.

The aircraft that flew in the Trials look strange by modern concepts and their performance is laughable by today's standards; but we must remember that the contest was held only nine years after the Wright brothers had made the first powered flight and only three years after Blériot had first flown the Straits of Dover on 25 h.p. at a height of only about 200ft.

Neither the Army nor the Navy had begun to take aircraft seriously, but the Trials at least had the effect of making the military mind think about aircraft possibilities, and they brought Army officers into close contact with the pioneers of the aircraft industry for the first time. So they were undoubtedly an historic milestone, the first milestone, on the road to world air power as we know it today.

HERE AND THERE



FLEET DEFENDER: Now completing evaluation at the Naval Air Test Centre, the tiny Douglas XF4D-1 Skyray has been ordered into large-scale production, which is being accelerated as the Skyknight contract finishes. The Skyray (named after the ray fish) is one of the smallest fighters we can call to mind—just right for aircraft-carrier stowage—and consists mainly of a huge Westinghouse J-40W-6 turbojet with afterburner. The nose-probe is soon to be replaced by a nose radome; all-rocket armament is under test.

Fouga 170R Flies

THE Fouga 170R twin-jet fighter/trainer (illustrated in *Flight* of July 11th) made its first flight on July 23rd, at Mont-de-Marsan, piloted by Léon Bourrieau. It was airborne for 25 min and the undercarriage and flaps were retracted at a height of 6,500ft. The speed—potentially of the order of 435 m.p.h.—was restricted to about 140 m.p.h.

Milan Display

ITALY'S aircraft industry is still running at something less than full throttle, and is consequently anxious to find new work. The facilities which the various firms can offer are likely to be given a full showing at a display to be held at Forlanini Airport, Milan, from September 14th to 23rd. A large static exhibition is now being prepared, and flying displays, conventions, and congresses are planned.

South Coast Race Entries

AMENDMENTS to the *Daily Express* Race entries, notified by the R.Ae.C. since the list on page 121 went to press, include the following: No. 27, Hayhow, is to fly his Aiglet Trainer G-AMOS; No. 51, the Comper Swift G-ABUS, will definitely be flown by David Ogilvy; No. 13's registration should read G-AHSB, and No. 76's G-AHWU; and the name of the entrant of the Saab Safir (No. 62) should read Col. A. V. Falk. Three non-starters—Forbes (Tipsy Trainer), Richey (Proctor) and Lashbrook (Proctor) already have been deleted from our list.

Reminder

LAUNCHED by a carrier task-force, some 100 U.S. jet aircraft recently flew just outside the three-mile limit off the coast of Communist China, to—in the words of the Pacific Fleet Commander, Admiral Radford—"give the Communists something to think about." Meanwhile, in Korea, the air war was again intensified by Allied fighter/bombers, which attacked in force a troop and supply centre near Wonsan, on the east coast. The pilots reported numerous hits by bombs, rockets and machine-gun fire, in the face of heavy A.A.

Magnet for Modellers

THIS August Bank Holiday Sunday and Monday (August 3rd and 4th) enthusiasts will flock to the British National Model Aircraft Rally. Organized by the Society of Model Aeronautical Engineers, this classic event is held each year in a different part of Great Britain. This year it is the turn of the south, and, by the hospitality of the Royal Navy, the event will take place at R.N.A.S. Gosport (H.M.S. *Sisikin*). It will be open to the public; admission is by programme, price 6d.

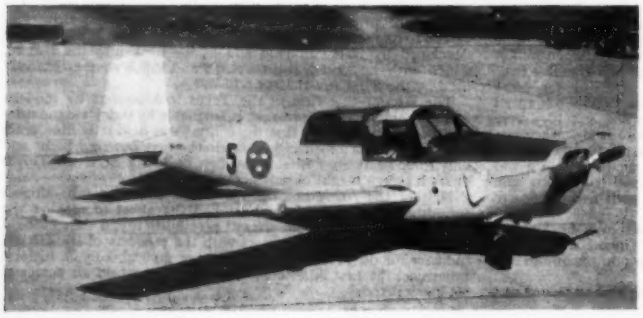
Fairchild-Fokker Link

EARLY this year the U.S.A.F. "Trainer X" specification was issued to the American industry, calling for an economical turbojet trainer capable of carrying full military equipment. Nobody was able to prepare a suitable design at the deadline date of June 1st, the weight clause being one stumbling-block and the lack of a medium-to-small turbojet another. But the Fairchild Corporation has now put a spanner in the works by signing a one-year licence to build the well-known Fokker S.14 Derwent-powered side-by-side trainer from Holland, which—apart from the weight clause, considered impossible of fulfilment—meets Trainer X specification perfectly. Under the NATO production plans, described in *Flight* last week, there is likely to be a big future for the S.14; an American source goes so far as to state that it is already on order for Holland, France, Italy, two South American countries and is being considered for production in Great Britain.

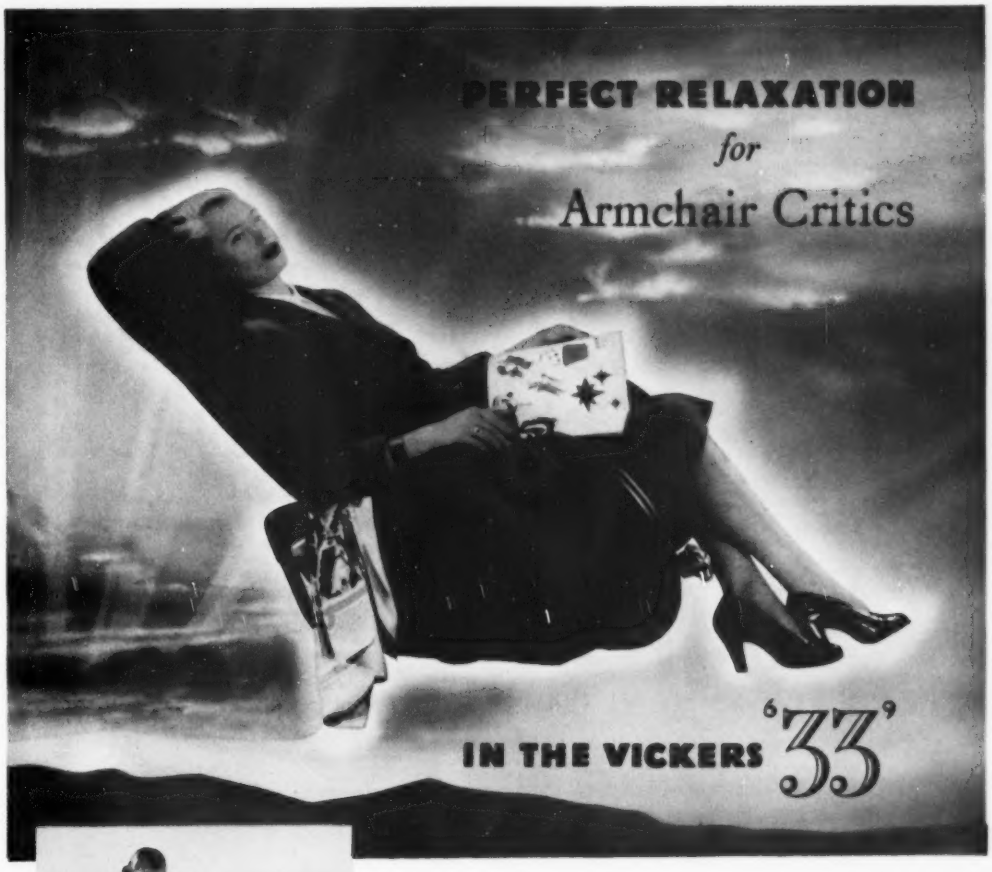
Suspected Sabotage

THAT a serious case of suspected sabotage had taken place the previous week at Greenwood R.C.A.F. station, Nova Scotia, was officially revealed in Halifax last week. A Lancaster which took off on "a routine flight" suffered an engine failure, and on return to the airfield it was discovered that the faulty unit contained rags and metal waste. It is reported that some fifty aircraft on the station were immediately grounded and their engines stripped, when it was discovered that another eight Lancasters had had similar objects placed in the air intakes of their Rolls-Royce Merlin engines.

COMING INTO THE PICTURE: The new Auster J.5G Cirrus Autocar on crop-spraying work. A note on this new model will be found in a news paragraph on page 116. The gross weight is 2,450lb and the cruising speed 110 m.p.h.



SUB-CONTRACTED: The first of the new Saab-91B Safir Trainer-Tourers (left) now being produced under Saab sub-contract in the Dutch De Schelde factory. It bears the colours of the Royal Swedish Air Force, which is to be supplied with a considerable number for primary training, under the designation Sk 50. Similar machines will also be used by the newly established Sabena pilot-training school.



Here is a Vickers aircraft chair providing luxury in every one of its 21 different positions, from upright to fully reclining. The shape and upholstery—the softest foamed rubber on spring and elastic bases—give perfect comfort. The chair can be used facing fore or aft and is particularly easy to instal, to detach for revised loading between flights and to maintain. Already the Vickers 33 is being used in B.O.A.C. 'Constellations', and in almost identical form in the 'Comet'. Full details will be sent on request.

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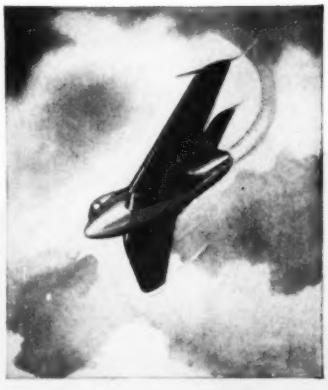
a tight turn . . . .

The skier's ability to make a tight turn on a fast down hill run may mean the difference between a race won or lost, or even life and death . . . Tight turns at the high speeds required of modern aircraft, impose stresses upon them which can only be endured if the design and quality of their component parts is of the highest. The ultra light magnesium alloy components made by Essex Aero Ltd fully meet these requirements.



magnesium alloy

ultra light components

ESSEX AERO LIMITED THE AIRPORT GRAVESEND KENT TELEPHONE GRAVESEND 4361 (4 LINES)

LITTLE STINGER: In spite of its "ultra-light" appearance and civil registration, the Fletcher FD-25 is really a very ferocious little prototype. It is, in fact, one of a number of small ground-attack aircraft which have recently been evaluated in the U.S.A.; powered by a 250 h.p. flat-six engine, it can carry several hundred pounds of rockets, bombs, or napalm tanks.

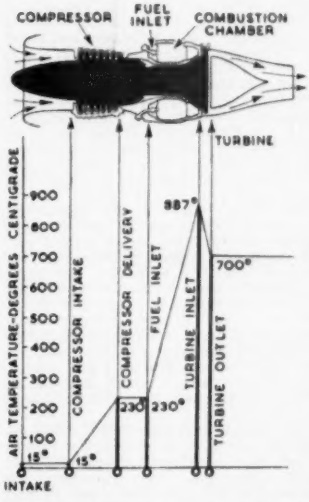
HERE AND THERE . . .

Rearmament Hold-up

PRODUCTION at the General Electric Company's gas-turbine plant at Lockland, Ohio, is reported to have been slowed down by the U.S. steel strike.

W.J.A.C. In Camp

NOW in summer camp at Hurn Airport, near Bournemouth, are 60 cadets of the Women's Junior Air Corps. They are receiving training in navigation, signalling, traffic control, engine maintenance and other subjects. Also there is the W.J.A.C. aircraft, Fairchild Argus G-AIYO, *Grey Dove*, in the charge of the Corps' chief pilot, Miss Freydis Leaf.



HOTTER AND FASTER: "Avro Canada News" is currently printing a series of short articles telling its readers "how the jet engine works." Among the illustrations is this diagram, indicating the changes in gas-temperature through the Orenda. The rise of 657 deg C through the combustion chambers expands the air so much that its velocity increases, it is stated, from 215 m.p.h. to 970 m.p.h.

Saucer Sequel

THE reported detection of a "formation of flying saucers" by Washington National Airport operators on July 19th has caused questions to be asked as to why jet fighters were not scrambled from the nearby Andrews A.F.B.—especially as the mysterious visitors were estimated to be travelling at the modest speed of 100 m.p.h. Contradictory explanations were given—one (official) was that nothing had shown on the Air Force radar screens; another (unofficial) was that the Air Force was advised, but took no action because the runway was under repair and the aircraft had been temporarily moved to Delaware.

IN BRIEF

THE University of Wales has conferred the degree of Doctor of Science *Honoris Causa* on Mr. Ivor Richard Cox, D.S.O., "in recognition of his outstanding services to the electrical industry." Mr. Cox is managing director of the Metropolitan-Vickers Electrical Co., Ltd.

* * *

A new coding system for T.I. light alloys, in which the reference numbers are clearly related to chemical composition, is explained in a new brochure published by T.I. Aluminium, Ltd., Redfern Road, Tyseley, Birmingham 4.

* * *

Mr. N. R. Reaney, A.S.A.A., F.C.W.A., and Mr. P. P. C. Drabble have been appointed to the board of Geo. Salter and Co., Ltd., the West Bromwich spring specialists. Mr. Reaney was appointed secretary in 1949 and Mr. Drabble has been production manager of the weighing-machine, roller bearings and castings divisions since 1949.

* * *

List No. B.H.35, a card issued by Hellermann Electric, Ltd., Crawley, Sussex, carries a sample of the new Helvin stud-fixed cable strap; made from P.V.C., these straps fit any diameter of loom and are supplied in any required length.

* * *

J. A. Ploszajski, A.F.R.Ae.S., of the Polish Air Force Association, states that, contrary to our original information, he was not the final winner of the flying scale-model section of the recent N.H.M.F.C. *Concours d'Elegance*. The first prize was, in fact, won by his club-mate, Z. Datkiewicz, with a superbly finished Luscombe Silvaire.

THE MINISTER OF SUPPLY, Mr. Duncan Sandys, meets Westland test pilot Derek Colvin during his recent visit to West-Country factories; the Minister flew frow Yeovil to Staverton in an S.55, seen in the background. On the left is E. C. Wheeldon, Westland's managing director.

TALKING ABOUT GLIDING

Points from the Madrid International Congress on Soaring Flight

THE fourth congress of the International Scientific and Technical Organization for Soaring Flight (OSTIV) * was held in Madrid from July 5th to 13th, concurrently with the World Gliding Championships. Some sixty scientific papers were read and discussed, both in the formal sessions and informally at all hours of the day and night.

Many famous gliding personalities attended, among them Professor Walter Georgii—director, in pre-war days, of the German Research Institute for Soaring (D.F.S.) and now an Argentine citizen and director of the corresponding Argentine organization. Professor Georgii, whose first book on gliding dates back to 1922, is honorary president of OSTIV. Also present were Wolf Hirth—designer of the Minimoa sailplane and investigator, in 1937, of the German Moazagotl standing wave—who is again building gliders in Germany; Capt. Ralph Barnaby, U.S.N., the first American holder of the "C" certificate for gliding; Dr. Wolfgang Klemperer, the first German "C" pilot and for the last 25 years a leader in American gliding; and Dr. Joachim Kuettner, expert on waves in Germany and America, who recently glided 450 miles from the Californian stratosphere in a wave-exploration flight. The fifty delegates represented more than a dozen countries, but none came from beyond the Iron Curtain. The proceedings were conducted in English and German, with occasional translations into French.

At the opening session on July 5th OSTIV was welcomed to Spain by the Director-General of Civil Aviation and by the president of the Royal Aero Club of Spain, the Duke of Almodovar del Rio. The president of OSTIV, Mr. L. A. de Lange (Holland) replied and invited Dr. August Raspet (U.S.A.) to read an introductory paper on *The Potential of Motorless Flight*.

In his paper, Dr. Raspet said that two recent remarkable distance-flights had been made possible by the application of aerodynamic and meteorological knowledge which had itself been acquired by the use of the sailplane as a research tool. Dick Johnson's 540-mile flight in thermals had been made in a sailplane which had been developed aerodynamically to have a gliding ratio of nearly 40 to 1, while Kuettner's study of atmospheric waves had enabled him to climb his sailplane into the stratosphere and then to fly from wave to wave for hundreds of miles. Rayleigh [1842-1919] had discussed the possibility of "dynamic soaring" (the use of variations in the wind speed) but this had not yet been achieved by man. Nevertheless the possibility of soaring in jet streams and in pre-frontal waves was under active consideration.

Aerodynamic improvement from changes in external geometry had been fully exploited and boundary-layer control was now being used to improve performances still further. As a research tool in this field the sailplane was unrivalled, since slipstream and noise, which are obstacles to obtaining laminar flow on powered aircraft and in wind tunnels, are absent.

The slow-flying and silent sailplane, able to fly in company with soaring birds, had also provided valuable data on bird flight. It now appeared that flight under human power was, for the first time in history, a practicability. The knowledge of how to maintain over the wing a laminar boundary-layer and of how to make a very light structure meant that considerably less than one horsepower would maintain a single-seat aeroplane in flight, and we knew that an athlete could work at this rate.

* * *

At subsequent sessions the Congress settled down to hear and discuss more detailed papers, mainly on meteorology and aerodynamics.

Meteorology.—Several points in the discussion centred on standing-wave phenomena. Nearly 500 years ago Leonardo da Vinci asked himself "why, if in the level bed of a stream there is a solitary rock, the water beyond it forms many protuberances?" but only recently have the meteorologists noticed similar sets of atmospheric waves in the lee of mountain ranges. They are sometimes marked by lenticular clouds which, although the local wind may be very strong, remain stationary relative to the ground. Little experimental data was available until 1937, when the German Moazagotl wave was explored by glider pilots. Since then observations have been made, mainly by soaring enthusiasts, in England, U.S.A. and the Argentine while the corresponding theories have been developed in England, U.S.A., France and Germany.

One result of the waves is that alternate areas of rapidly rising and sinking air occur in which aircraft may be lifted or forced down at great rates. Sailplanes have been climbed in the United States to nearly 50,000ft and further progress is limited at present mainly by the lack of pressure-cabin sailplanes. Lenticular, "mother of pearl" clouds 90,000ft above Alaska have been studied and suggest that, once the pressurization problem is solved, gliders may well be able to reach 100,000ft. The power of the up-current is shown by the fact that Bob Symons in California climbed an eight-ton Lightning P.38 with both airscrews feathered from 10,000 to 30,000ft three times while waiting for a dust storm to clear the airfield.[1] The down-currents are equally powerful and with them may lie the secret of many mysterious crashes in mountainous country.

Meteorologists have welcomed the data collected by glider pilots and the large attendance heard descriptions of wave flights from Prof. Georgii (Argentina), Drs. Klemperer and Kuettner (U.S.A.), Alan Yates (Great Britain), Constans Camargo (Spain), and Frau Vieweg-Pielsticker and Heinz Watcher (Germany). It was mentioned that, in contrast to the waves occurring in the lee of the Alps, the Pyrenees, the High Sierras and the Andes, the large number of observations in Great Britain showed that waves have been found up to ten or twenty times the height of the hills causing them.

Most of the meteorologists whose calculations have enabled the conditions favourable for wave generation to be studied were at the Congress. Paul Queney (U.S.A.) and Gerhard Lyra (Germany) were among the first in the field, but their calculations suggested that the wave amplitude would increase with height. Dr. R. S. Scorer of Imperial College, London, showed that an increase in wind speed with height favoured wave-formation and damped the amplitude at great heights. His forecast of little damping along the wave train had been confirmed in England, where up to ten waves had been flown

A group of meteorologists during the OSTIV meeting: they include (in the centre) Professor Georgii, Dr. W. Klemperer and Dr. R. S. Scorer.

* *The initials of the French title make "OSTIV." The corresponding international organization between the wars had the initials in German, "ISTUS."*

in and many more had been seen. Other contributions to the theory came from Joachim Kuettner and M. G. Wurtele (U.S.A.), J. Zierep, Fritz Rossman and Fritz Höhndorf (Germany) and H. Merbt (Sweden).

The Californian wave flights had been high enough to contact jet streams, the long shallow layers of fast-moving air sometimes to be found around 30,000ft. The extreme turbulence near the stream boundary was uncomfortable to fly in—it might be the cause of the "clear-air gusts" which occasionally struck high-flying aircraft—but could possibly enable gliders to soar with the jet stream. J. Kuettner argued that the meteorological conditions when the jet stream occurred would favour the formation of travelling waves which a glider could use.

Several papers were read on the structure of cumulus and cumulo-nimbus clouds, including one by Frank Ludlam of Imperial College. In spite of the fact that much more gliding takes place in cumulus clouds than in waves, the data on cloud currents is very limited. Dr. Scorer announced that Mr. Ludlam would shortly be leading a research project at Cranfield, Bedfordshire, in which gliders flying under and within cumulus clouds would be used to obtain information on the air currents around these clouds.

Aerodynamics.—Dr. August Raspet, whose glider research at Mississippi State College has shown what great performance improvements are possible on the ordinary sailplane, described some recent work on boundary-layer control. A N.A.C.A. 4416 aerofoil section fitted to part of the wing of a two-seater glider had its profile drag measured by means of a pitot comb across the wake. When the forward part of the wing had been carefully contoured the transition point was found to be at about 0.35 chord, at moderate lift co-efficients, with $C_{D_0} = 0.008$ approx. When suction was applied to progressively increasing areas of the wing (by pricking large numbers of holes through the fabric and lowering the wing internal pressure) the laminar boundary-layer was maintained back to 0.95 chord and the corresponding C_{D_0} (allowing for the suction power) reduced to 0.004.

Experiments were continuing in which the airflow through the porous surface was obtained by a hollow-bladed windmill attached to the wing trailing edge. The windmill acted as a centrifugal pump and increased the drag by only about one quarter of the amount gained from the boundary layer.

A paper by H. Carmichael (U.S.A.) discussed the ultimate performance possibilities of sailplanes and showed that gliding ratios of 60 to 1 might be expected from the existing RJ 5 if boundary-layer control were applied. There were no papers on wing-tip shapes, although it was noticeable that several French and German gliders competing in the World Championships were fitted with wing-tip fairings shaped like tip-tanks.

Allied Subjects.—Among other papers at the Congress were one by B. S. Shenstone (chief engineer, B.E.A.) on *The Development of Two-seater Sailplanes* and one by Hal Cronkhite (U.S.A.) on *Low-cost Sailplanes*. In the authors' absence they were read by Peter Brooks and Lt.-Col. Ely respectively, and both mentioned forthcoming developments in plastic construction. The British Gliding Association's competition in 1947 for two-seater designs has led to the construction, with financial help from the Ministry of Supply and from the Kemsley Flying Trust, of the winning Kendall "Crabpot." It is to have wings made from Durestos plastic. Mr. Cronkhite called attention to a lightweight foam with a density of only 1.6 lb/cu ft, which would be very suitable as a sandwich filling in glider-wing construction.

A. H. Yates of the College of Aeronautics described experiments with a sailplane gyro-horizon and direction indicator driven by Venner silver-zinc accumulators. The whole equipment weighed only 20 lb and the instruments would run for 7hr at a charge.

The papers will be published in due course by OSTIV and should form a valuable record of the present state of knowledge.

OSTIV Organization.—At the business meeting of OSTIV, officers were elected as follows for the period 1952-4 :—

Honorary president, Prof. Walter Georgii (Argentine); president, L. A. De Lange (Holland); vice-president, Dr. W. Eichenberger (Switzerland). Members of the Board : Ing. B. J. Cijan (Jugoslavia), C. Grandjean (Belgium), O. Gibelli (Venezuela), Dr. W. B. Klemperer (U.S.A.). Secretary-treasurer, Dr. J. P. Honig (Holland); chairman (scientific section), Prof. Georgii (Argentine); chairman (technical section), A. H. Yates (Great Britain).

In view of the difficulties in organizing frequent congresses, much of the interchange of information which OSTIV exists to foster must be done by correspondence, and this is co-ordinated by the two section chairmen.

A description of the fourth congress would be incomplete without a tribute to the hospitality of the Spanish Royal Aero Club and its president, the Duke of Almodovar del Rio. The visits organised for delegates to Segovia and to El Escorial, the lunches, the dinners, the bouquets to the ladies of OSTIV : all will long be remembered with gratitude.

A.H.Y.

TOMORROW'S SOUTH COAST AIR RACE

FOR the *Daily Express Trophy* Air Race, to be flown tomorrow, Saturday, August 2nd, 46 entries—detailed below—have been received. Starting at Shoreham Airport, the course is, with minor modifications, the usual one *via* Brighton to Newhaven, where a turn inland is made and a leg flown to Reculver, near Herne Bay; thence competitors will turn eastward on to the coastline and follow it round *via* Margate, Foreness Point, Whiteness, North Foreland, Broadstairs, Ramsgate, Folkestone, Hastings, Bexhill, Eastbourne and Beachy Head to the finishing-line at West Pier, Brighton. The start is at 2.30 p.m., and the race should finish about 4.15 p.m.

Most of the regular British racing enthusiasts are competing, and there are five foreign pilots—Capt. Christie from Norway, this time flying a vintage type—a D.H. Leopard Moth; the Czech pilot Marmol, in a Belgian-registered Proctor I; Capt. Bissmarck in the Swedish Embassy's Saab Safir; and the Italians, Rosaspina and Ferrari, in the Ambrosini F.4 (Walter Mikron) and S.7 (Gipsy Queen) respectively.

The public will, we understand, be admitted free to an enclosure at Shoreham Airport, except for parking charges (cars 2s 6d, motor cycles 1s, coaches 10s) and public-address systems at holiday resorts along the coast will relay the progress of the race. It is hoped that formations of Attackers and Meteors, and a Canberra, will fly round the course before the start.

No.	Entrant	Pilot	Aircraft	Engine(s)	Reg.
7	H. M. Kendall	Entrant	Chilton D.W.1	Carden Ford	G-AFGI
8	H. Best Devereux	Entrant	T'craft Plus D	Cirrus Min. I	G-AIXB
12	C. Gregory	Entrant	T'craft Plus D	Cirrus Min. I	G-AHGZ
13	Penguin F.C.	D.G.S. Cotter	T'craft Plus D	Cirrus Min. I	G-AHWI
18	H. Tempest, Ltd.	P. B. Cash	Autocrat	Cirrus Min.	G-AGTY
20	D. R. Robertson	Entrant	Moth Minor	Gipsy Min. I	G-AFPN
25	Longford Engineering Co. Ltd.	G. A. Farley	Autocar	Gipsy Maj. I	G-AJYY
27	T. W. Hayhow	Entrant	Aiglet Trainer	Gipsy Maj. I	G-AMMS
28	E. W. Westbrook	Entrant	Messenger IVa	Gipsy Maj. ID	G-ALBE
31	G. Marler	Entrant	Falcon Six	Gipsy Six	G-ADTD
32	H. K. Hughes	B. J. Snook	Tiger Moth	Gipsy Maj. I	G-AMUN
35	W. P. Bowles	Entrant	Messenger IIa	Cirrus Maj. 3	G-AJYZ
40	Capt. J. H. Christie	Entrant	Leopard Moth	Gipsy Maj. I	LN-TVT
42	D. D. Stiff	Entrant	Hawk Trainer	Gipsy Maj. I	G-AJHA
43	Penguin F.C.	Mrs. Y. M. Grace	T'craft Plus D	Cirrus Min. I	G-AHKO
45	H. Blumenthal	Entrant	Hawk Major	Gipsy Maj. I	G-ACYO
46	R. S. Spackman	Entrant	Moth Minor	Gipsy Min. I	G-AFNI
48	Miss E. L. Curtis	Entrant	Foster Wicko G.M.1	Gipsy Maj.	G-AFJB
49	Hampshire A.C.	J. K. Quill	T'craft Plus D	Cirrus Min. I	G-AHCR
50	C. A. Pike	W. P. I. Fillingham	Moth Minor Coupe	Gipsy Min. I	G-AFOJ
51	C. G. Alington	Entrant or D. F. Ogilvy	Comper Swift	Pobjoy Niagara 3	G-ABUS
52	Midland A.C.	N. A. Harper	T'craft Plus D	Cirrus Min. I	G-AHVS
53	R. E. Clear	Entrant	Comper Swift	Pobjoy R.	G-ACTF
60	A. Cdre. G. Adams	Entrant	Proctor III	G. Queen 2	G-AKZR
61	L. C. Marmol	Entrant	Proctor I	G. Queen 2	OO-INT
62	Col. A. V. Talk	Capt. S. F. Bissmarck	Saab Safir	Gipsy Maj. 10	91123
63	S/L. D. White	Entrant	Proctor V	G. Queen 2	G-AGTC
65	*News of the World*	D. R. S. Bader	Gull	Gipsy Six	G-ADPR
68	S/L. J. A. R. King	F/O. M. R. T. Chandler	Hawk Trainer IIIa	Gipsy Maj. I	G-AKRV
69	H. J. G. Turner	Entrant	Proctor III	G. Queen 2	G-AIKJ
72	W/C. R. H. McIntosh	Entrant	Proctor I	G. Queen 2	G-AHGA
73	A. S. K. Paine	Entrant	Proctor I	G. Queen 2	G-AHNA
75	V. Van Damm	Mrs. Z. Irwin	Proctor V	G. Queen 2	G-AIET
76	D. J. Bennett	Entrant	Proctor V	G. Queen 2	G-AHWV
77	Blackburn and General Aircraft	H. Wood	Proctor V	G. Queen 2	G-AHWR
78	J. P. Crowther	Entrant	Proctor III	G. Queen 2	G-AKWV
82	W. W. Lyle	Entrant	Proctor I	G. Queen 2	G-AHDJ
84	D. J. Adie	F. C. Muir	Mercury VI	Cirrus Maj. 3	G-AHAA
87	Societa Aeronautica Italiana	Vico Rosaspina	Ambrosini-Rondone F.4	Walter Mikron 2	I-ADRC
88	S. E. Norman	H.R.H. Prince Alexander of Yugoslavia	Gemini IIIb	2 Gipsy Maj. 10	G-AJTG
90	J. N. Somers	Entrant	Gemini III	2 Gipsy Maj. 1c	G-AKDC
92	G. A. Ferrari	Entrant	S.A.I. Ambrosini S.7	G. Queen 30	I-BOZI
93	W/C. C. M. M. Grace	Entrant	Nighthawk	Gipsy Six 2	G-AGWT
94	P. Dunkerley	Entrant	Gemini Ia	2 Cirrus Min. 2	G-AKKB
95	S/L. J. Rush	Entrant	Falcon Six	Gipsy Six	G-AECC
96	R. R. Paine	Entrant	Hawk Speed Six	Gipsy Six 1f	G-ADGP

Commercial Aviation Commentary

By HENRY MORRIS

IT is now some weeks since the initial statement of Government policy for air transport was made in the House of Commons. After the first immediate reactions, varying from not-very-convincing expressions of horror from the Opposition to howls of disappointment from the independent operators there has been ample time for calmer reflection and assessment of exactly what the Government is offering.

The outcome of this reflection seems to be merging into a surprising amount of satisfaction amongst all the parties interested in this vital problem, whatever their political leanings. The Corporations—quite rightly for State-owned concerns—have almost completely refrained from comment on the political implications of the statement. The independent operators appear to have soft-pedalled their public criticism of the policy. The officials of the Ministry of Civil Aviation seem to be unanimously of the opinion that the policy statement represents a nice middle-of-the-road attitude which really leaves it to them to preserve the delicate balance between non-interference with the established preserves of the Corporations and the parcelling-out of a few new operating opportunities to "reputable" independent operators.

The people who should be most concerned in the implications of the policy—the public, which uses (or would like to use) air transport and who have placidly watched so much of their painfully extracted taxes being poured into the avid civil-aviation furnace over the last few years—have shown virtually no interest at all.

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POSSIBLY all this is because no one really knows exactly what the policy statement means. And it is difficult to escape the conclusion that the Government itself, having made the statement, is now waiting for the interested parties—call them contestants—to suggest to it how in their particular conceptions the policy could be interpreted and applied. In other words, the referee, who also wrote the rules (without knowing exactly how the game is played), has now kicked the ball off and is hoping that the teams will soon get tired of battering at each other and come along hand-in-hand with some workable improvement to the rules. It is possible that the Corporations are thinking that the policy statement has been cleverly and ambiguously worded so that they, as the "haves," can continue in that happy state virtually undisturbed. And perhaps the independent operators, being the "have nots," believe that the statement was so framed to give the Government plenty of scope to divert, little by little, many opportunities in their direction without having to go through the painful process of another big show-down!

But the wiles of the politicians must not be under-rated. This was demonstrated by Lord Pakenham in the last debate on the subject in the House of Lords. After the customary party exchanges, and the seizing of opportunities by both sides to put over the hoary old dogmatic declamations for the sake of the Hansard record, Lord Pakenham put forward a plea for a national policy for air transport. It is difficult to avoid the reflection that his idea of such a policy is almost certainly a one-sided Socialist one; but he has deservedly been commended for concluding the debate on a more than usually lofty level.

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THE industry, even more than the public which seems content to accept what is given it, would welcome the establishment of a National policy. And if the industry could be given a directive, backed by both the main political parties, to sit down for a few weeks and work out a *modus operandi* under which the State and private enterprise sides would recognize the inevitability of each other's permanent existence, and between them suggest some sharing-out of future operating opportunities, then the Government (present and future) might be spared the unpleasant task of imposing a policy which might satisfy nobody.

It is a fact that certain elements on both the State and private sides of the industry would be prepared to try to produce some such joint formula, and would agree essential conditions for the prosperous development of their respective spheres—even if they did not thereafter regard each other as long-lost brothers at last returned to each others' arms to live in peace and plenty under the benevolent protection of their foster-father, the M.C.A.

• • •

BUT perhaps this is an impossible ideal, as the industry as a whole would have to accept and affirm certain premises, each of which might be unacceptable to some party or other.

Firstly, the declared object of all parties would need to be maximum economic expansion of the industry as a whole, and not any privileged part or parts of it. Secondly, the present weak state of the industry would have to be admitted, and inquests into the whys and wherefores would have to be solely for the object of profiting by past misjudgments. Thirdly, the State Corporations and the independent operators would, at least among themselves, have to face up to their own inefficiencies and weaknesses and drop all temptation to indulge in smoke-screening propaganda. Fourthly, all parties would have to recognize that, irrespective of the relative size of the different participants in the industry, they must all have parallel security of tenure. Fifthly, they would have to work out some joint aircraft-procurement programme without any attempt to seek preferential treatment for any particular section.

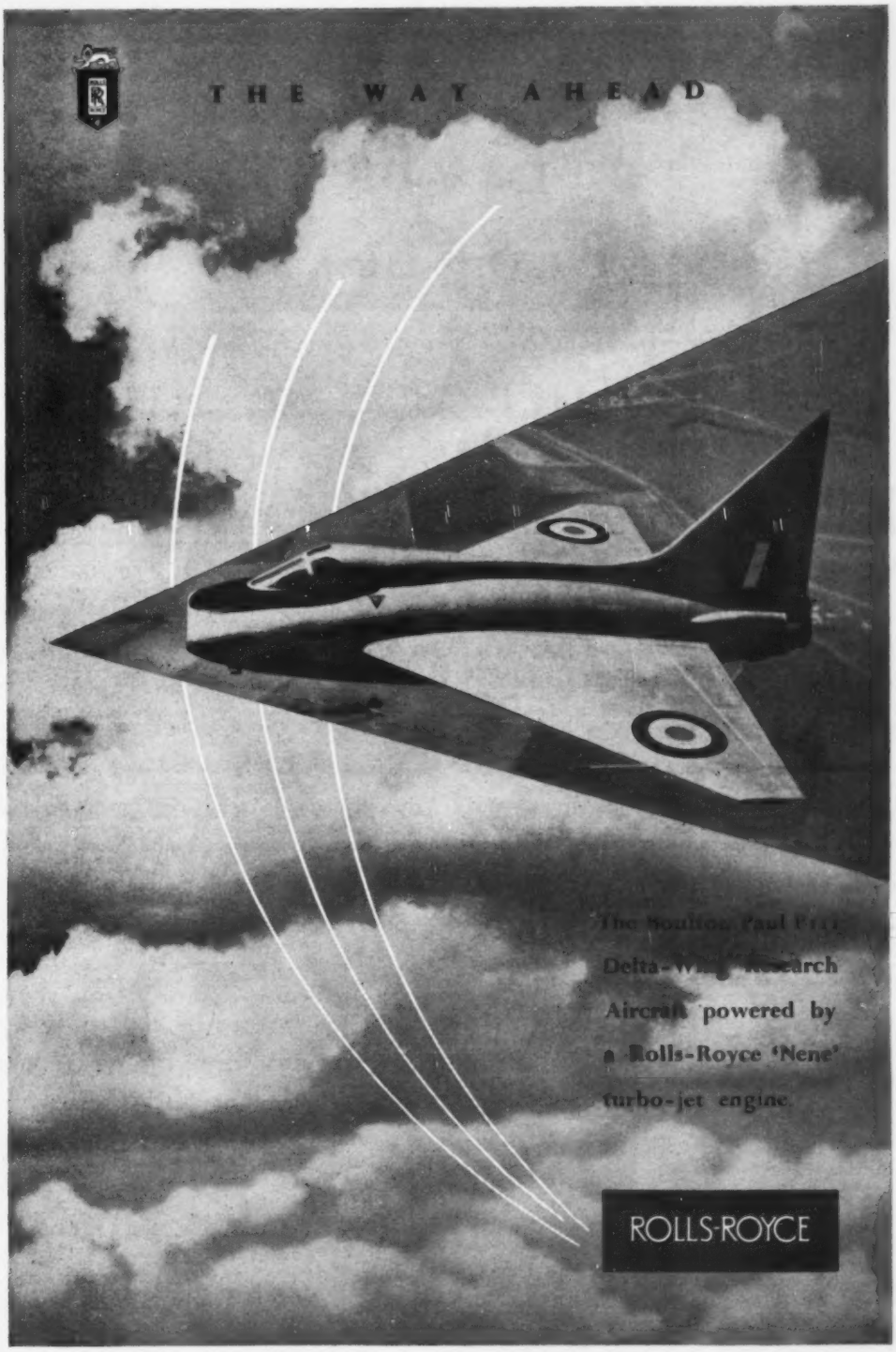
There would, of course, be other premises, but these would have to feature amongst the preliminary table-clearing understandings. And it would be up to the Government to take the lead by suggesting some such *rapprochement* to the different elements in the industry.

• • •

ON July 16th there was another Commons debate. Again it produced few new ideas and little fresh light on how exactly the Government's policy is to be interpreted. There was no serious divergence of views over the desirability of continued and expanded private enterprise participation in the air-transport industry, but at the same time no one got down to facts and figures as to the probability and extent of such participation.

The new policy will stand or fall by a simple criterion: whether or not it will attract heavy private finance into air transport; without this, the contribution of the independent operators will be stagnated from the beginning. There were signs that the problem was appreciated on both sides of the House, but it is one of those knotty controversial matters best skated around! The only alternative to heavy private finance is direct aid from the Government in the shape of aircraft provisioning, and perhaps this is well in the minds of both the Government and the Opposition. G/C. Wilcock, in winding up the debate for the Opposition, did at least mention that few, if any, operators could think of ordering up-to-date aircraft, and that this was a point which might be taken up with the Chancellor of the Exchequer.

In any case, all the talking—at least in public—seems to be over, and it seems that a compromise between the not-very-divergent views expressed by the Government and Opposition spokesmen in both the Lords and the Commons can be looked upon as the probable "national" policy to which Lord Pakenham referred. If the Minister does now concentrate on persuading the Corporations and the independent operators to hatch out a scheme between themselves, then perhaps these two sides of the industry will progress at least in amity, if not (*vide* the *Flight* leading article last week) in actual wedlock!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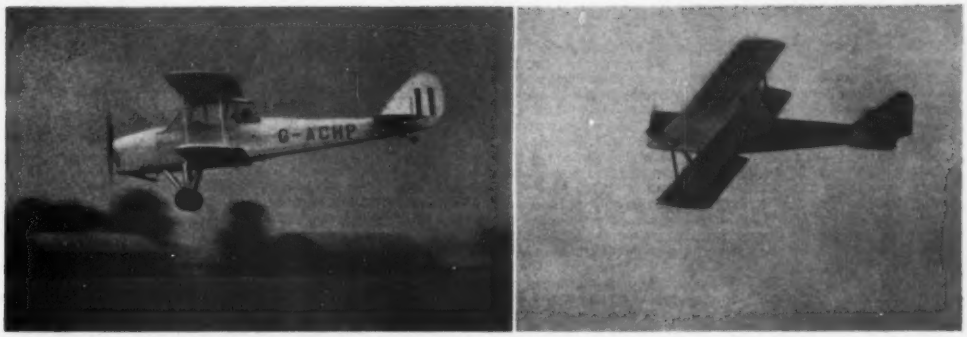


Two vintage Avro types are the Club Cadet and the Avian 4m, owned by the V.A.C. and the Avian Syndicate respectively. Both machines have raced during the summer. G-ABEE is powered by a Gipsy II, while the Genet engine originally fitted in the Cadet has been replaced by a Gipsy Major I.

VINTAGE ENTHUSIASM

Pre-War Club Spirit Successfully Revived: the Aims of the V.A.C.

THERE is an old saying that it is always a mistake to try to recapture a pleasant atmosphere of the past; so when the Vintage Aeroplane Club announced that one of its aims was "To try and recapture the spirit that existed in private flying between the wars" it must have sounded like a forlorn hope. But is it really so hopeless?

As a race, we haven't changed so much in twelve years. The only thing that is needed to get us out of the rut is a little stimulus of the right kind; and what better incentive than a common interest in keeping the older (and, to my mind, purer) types of aircraft in the air?

Let us not sit around moping and complaining that private flying is beset with restrictions, difficulties and unbearable expense. We know it is difficult—that is why it is so much more enjoyable once it is achieved. But can you think of a better way of spending a summer's afternoon than on a grass field, watching the leisurely flying of such types as the pretty Cirrus Moth with its quiet, contented engine, or the spritely Tomtit aerobatting near enough to be seen without deafening the onlookers? They are a treat to fly and a pleasure to watch.

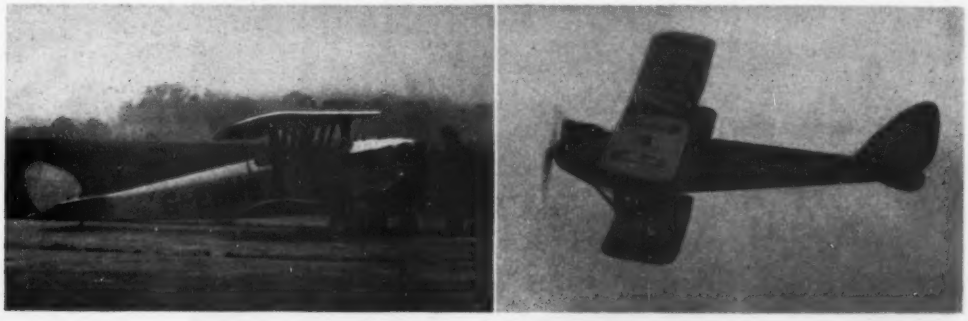
The Vintage Aeroplane Club was formed for people who enjoy this sort of thing, either as pilot or onlooker. But it isn't enough to get together the vintage types of aircraft that are flying now. A further aim is to bring the neglected ones out of their dark corners and get them into the air. This may seem wishful thinking; but it need not rest at that, as several of our members have proved.

You don't have to be one of the favoured few to run an aeroplane. If you have sufficient enthusiasm, initiative, and the ability to over-ride frequent and seemingly insurmountable setbacks, a slender purse is sufficient to launch an old machine back into the air. Let me give some examples.

The Cardiff Ultra Light Club do all their own maintenance, members taking an equal share. They run two Tipsy Bs, and many of them have learnt to fly for next to nothing—if one doesn't count the hard work. The beautifully kept red Aeronca that features at most of our own rallies was renovated by its owner, Mr. Colbourne, and a grand job he made of it. The Avian was built out of two old wrecks by a syndicate that worked all winter in a garage, starting with little or no technical knowledge, and learning the hard way. The Air Registration Board were suspicious at first, but when it was realized that the members were deadly serious and anxious to abide by the rules, the Board gave all the help it could. The work was supervised by a licensed engineer, and each man paid so much a week into the kitty for the cost of materials. After six months' hard work and a lot of headaches, the Avian took the air, and has been a great source of pleasure and pride to its owners ever since, while providing flying at half the usual cost.

The Ministry of Civil Aviation has recognized the V.A.C. as a club, and full petrol tax rebate is allowed to all syndicates that are members. This is extremely helpful, and knocks about ten shillings an hour off the cost of flying the average type. The V.A.C. committee want to see many more associate members banding themselves together in order to re-build some fine but neglected type, and for them we have to offer free technical advice and guidance from Mr. Bianchi, a very experienced aircraft engineer, who gives his services free to the Club as a technical adviser. A monthly newsletter carries a "wanted" and "found" column for bits and pieces of aircraft and engines and, shortly, an "Any old wrecks" column will carry information about the

The two oldest aircraft on the British Civil Register, the Hawker Cygnet I and the D.H.60 Moth, make regular appearances at V.A.C. meetings. The Cygnet, which has an all-up weight of 900lb, is powered by a Bristol Cherub III and the Moth by an A.D.C. Cirrus III. Unlike the two vintage types depicted above, neither of these machines has a C. of A. and both must therefore fly on permits issued specially for each occasion.



VINTAGE ENTHUSIASM . . .

location, condition, and possible price of derelict aircraft that come within the "Vintage" definition. When a group is working on a project, an appeal for help or the loan of equipment finds a ready response from the committee, who have a pretty comprehensive knowledge of where to find the necessary. This Club is for the enthusiast with a willing pair of hands; it has no time for the "I care not what happeneth to thee, Jack" formula.

With the aid of the Kemsley Trust, an Avro Cadet has been acquired for the use of members who are qualified pilots, and it can be hired at a non-profit making rate by those who like a handy biplane. It is also available for those not fortunate enough to have machines of their own, so that they may on occasions take part in the competitions that occur during the organized rallies. These contests are designed to bring out the handling qualities of the aircraft as much as to give the pilot a chance to show his skill, and a trophy is to be awarded annually to the aircraft that has accumulated the most points during the competitive year.

Most of the criticisms levelled at the club come from older folk who, after attending a meeting, remark disappointedly, "I was expecting to see some S.E.5s or Farmans. Now when I was in the Royal Flying Corps, etc., etc." We are sorry about that, but we leave such types of machine to the organizations that can afford to keep them in a box all the year round and bring them out on high days and holidays. Our definition of a vintage aircraft is that it shall be one "which went out of production before 1939, or any machine which by reason of its rarity or uniqueness is considered eligible by the Committee, providing that such aircraft shall have a *current* C. of A."

A flying instructor, in a recent letter to the technical Press, complained that after obtaining a P.P.L. the average pilot did not know what to do next, and his interest invariably waned. If he flies typical modern club machines, this loss of enthusiasm is not surprising. By encouraging the flying of older types without the niceties of differential ailerons and weathercock stability (and by flying, we do not mean map reading from A to B, but learning to handle these versatile aircraft well) we feel that something is being done to offer the private pilot an extension of his interests.

For our non-flying members, there is a modelling section (vintage models only, of course), while an historical branch has just been formed; and, as has already been said, every help is being offered to them to get in the air themselves.

These are modest aims, no doubt; but we do find that when a crowd of vintage enthusiasts get together, the right spirit begins to develop naturally; and that's what we are after. R. E. G.

THREE NEW BOOKS

"Night Be My Witness," by Walter Clapham. Jonathan Cape, Ltd., 30 Bedford Square, London, W.C.1. Price 12s 6d.

THIS is a war novel, with the inevitable technicolored language and bedroom scenes; but don't let that stop you reading it. Walter Clapham's characters are no better and little worse than many of the young aircrew of Bomber Command, who can hardly be condemned for breaking convention when their whole way of living and dying was unconventional and terrible.

The reader will not need to be told that the author was himself an N.C.O. bomb-aimer in Bomber Command. Only personal experience, coupled with a unique sense of observation and descriptive ability could produce such a book, in which no character or scene is ever larger than life.

Central characters of the story are three young ack-ack gunners who volunteer for flying duties with the R.A.F. One becomes a pilot; the others fail to get their wings and remuster as bomb-aimers. Two are killed, the third lives to face the disillusionment of trying to fit into a post-war world that seems hardly worth their sacrifice.

This book is worth reading for its semi-documentary description of life at training stations in Florida and Canada, and of the humour and tragedy of wartime bomber operations from North Africa and Britain.

"Faith is a Windsock," by Miles Tripp. Price 12s 6d. Peter Davies, Ltd., 38 Bedford Square, London, W.C.1.

HERE is yet another book in the current spate of fiction-founded-on-fact R.A.F. novels; again, too, the characters are Bomber Command crews. This particular story is capably told, and in a not-too-lurid style, thereby gaining in its descriptive effect. The incidents are threaded on a rather thin plot, but the author's character-drawing is so good that the book remains interesting in spite of the lack of suspense. He makes no concessions to the reader not conversant with Service slang and technical terms: the uninitiated will find themselves badly in need of a glossary.

"Stuka Pilot," by Hans Ulrich Rudel, with a foreword by Group Capt. Douglas Bader, D.S.O., D.F.C. Euphorion Books, 302 Vauxhall Bridge Road, London, S.W.1. Illustrated. Price 12s 6d.

A FEW weeks ago, in reviewing the biography of a great British airman, we complained that the subject of the work was "so modest and unassuming that the author was given little first-hand material on which to base his book—a fact that became all too obvious to the reader." Nobody will accuse *Luftwaffe* pilot Hans Ulrich Rudel of the same virtue—a virtue that can become tedious. He is proud of his athlete's stamina, his record of 2,530 operational flights on the Russian front, meetings with his Fuehrer, and his medals. In fact, he is so proud of his medals that, when he lands in enemy territory, then has to sprint for half an hour in fur boots and coat to escape from "droves of Ivans" and make a hazardous descent of an almost perpendicular cliff, he still remembers to put the medals in his pocket before swimming the freezing, 600 yards-wide Dniester river.

Of course, they were rather special medals. Some components of his "one off" Gold Oak-leaves with Swords and Diamonds to the Knight's Cross of the Iron Cross weighed several pounds, and the Swords and Diamonds were framed in gold.

Rudel's record of operational sorties is unequalled by any other pilot in the world, and the fact that most of them were made in Ju 87s, under the noses of Yak-9, Airacobra and Mustang fighters, says much for his flying skill. His description of the low-level attack in which he sank the Russian battleship *Marat* is most exciting, and those who remember with affection the Hurricane IID "tank-buster" will appreciate notes on the development and operational success of its German counterpart—the Ju 87 with two 37 mm flak cannon under its wings.

There is much more of interest, including details of the use of Ju 87s as glider tugs; Rudel's respect for Russian flak (a weapon which brought him down many times), and his contempt for Russian pilots (who didn't); impressions of Russian village life; and of the first shock of being shot at by Rumanian "allies".

STRETCHED AND SWOLLEN: The prototype Lockheed 1049 Super Constellation has had to undergo not only the familiar stretching process (compared with its forbears), but also the less-common swelling process. In its latest form it is serving as a flying test-bed for the forthcoming Lockheed WV-2 high-altitude radar-warning aircraft for the U.S. Navy.

2 out of 3

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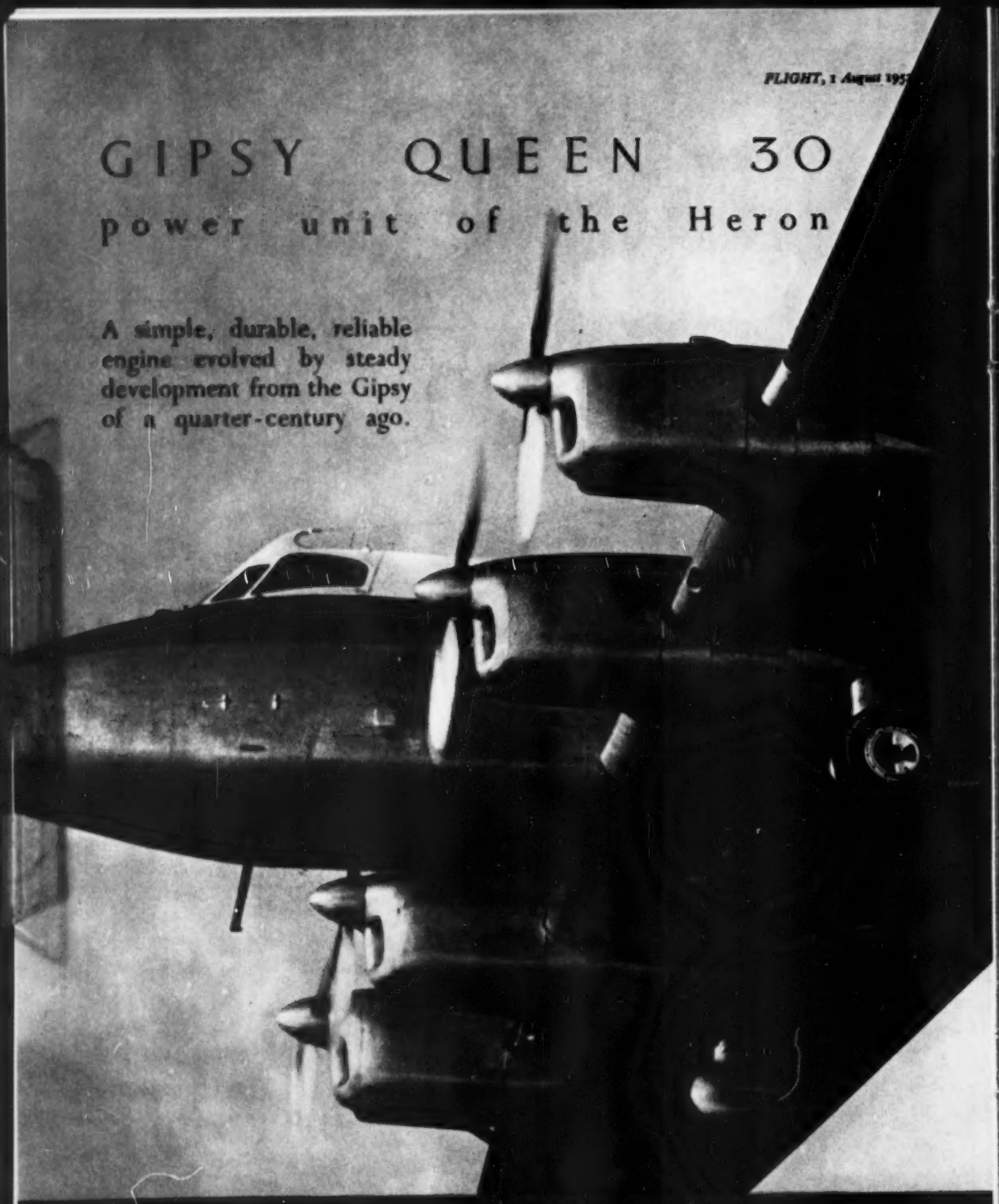


DE HAVILLAND ENGINES

The Viscount 700 calls at Nice on its way east. Below, some of the large crew who took part in the tropical trials: (left to right) W. A. Palmer, Dunlop; S. Morris and A. Thomas, flight engineers; S. N. Sloan, captain; J. Wrenn, inspector; and W. H. Fell, navigator/radio operator and deputy tour-manager. All except Mr. Palmer are Vickers-Armstrongs personnel.

PREPARING THE Viscount FOR SERVICE

Results of Hot- and Cold-weather Trials

EACH year the S.B.A.C. Display and Exhibition is responsible for a race against time to complete and fly the industry's latest prototypes; the whole of August seems to be given over to feverish preparations of one sort or another, almost, one might think, to the exclusion of other work. In actual fact, however—this year in particular—a great deal of production work of top priority is also proceeding on aircraft which were the highlights of earlier shows but are now familiar to all. Perhaps it is not only inevitable but desirable that civil airliners such as the Comet and Viscount—outstanding though they are—should no longer be lined up with the new arrivals, but regarded as old friends.

Immediately after Farnborough this year it will be the time for delivery to B.E.A. of their first *Discovery*-class Viscount. With the introduction of this aircraft on the European routes early next year there is no doubt at all that members of the air-travelling public will experience a new high standard of comfort combined with speed. The prestige of British civil aircraft abroad will certainly be enhanced.

The first Vickers-Armstrongs Viscount 700 has just completed a demonstration and sales tour in the Middle and Far East. Prior to this, firm orders had been announced for 42 Viscounts: 20 for B.E.A., 4 for Aer Lingus, 12 for Air France, and 6 for Trans-Australia Airlines. Mr. George Edwards, chief designer, said recently that 54 Viscounts had now been ordered, and it is understood that six of the additional twelve will go to B.E.A., making a total of 26, and six to an overseas operator, so far unnamed. Regarding production and deliveries, Mr. Edwards said that no orders had been lost through the company being unable to offer early delivery dates. During the next two years the production rate will work up to the planned four aircraft per month, and it will be possible to increase this figure to six aircraft per month if the demand arises. This is a high rate for such a civil design and compares favourably with that achieved by U.S. manufacturers.

Since the first 630 prototype of this four-Dart turboprop airliner flew on July 16th, 1948, a very great deal of flying experience has been gained, both with that aircraft and the second, slightly larger, 700, which first flew in August, 1950. In particular, the successful period of trial operation on B.E.A. routes may be recalled. Their totals of flying time to date are, respectively, over 900 hr and over 600 hr. In addition the Tay-Viscount has done a good deal of flying. The span and length of the type 700 are 94ft and 81ft 2in, compared with 89ft and 74ft 6in for the type 630. The present a.u.w. of the 700 series is 52,500 lb.

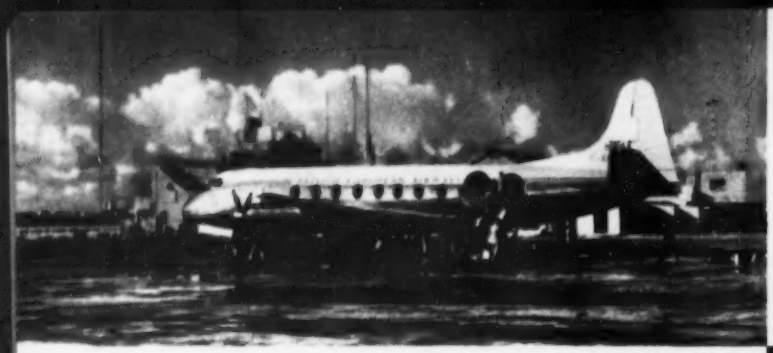
Last autumn and during the early part of this year the Viscount 700 G-AMAV completed tropical and icing trials, prior to the issue of its full C. of A. The results of the many tests have now been assessed and it is of interest to mention some of the details of the tropical-test schedules and to record results.

It was on October 5th last year that the Viscount left for its trials in Africa, and the first stage of its journey took it to Nice. From there it flew on to Malta, El Adem, Wadi Halfa and Wadi Seidna, where trials started in earnest. Wadi Seidna was used in place of nearby Khartoum because work was being carried out on the Khartoum runways. The Viscount was ferried between the two airfields each day, the flight taking 10 min, as compared with an extremely tiring and uncomfortable couple of hours in a truck on the desert track. The first pilot throughout the trials was Mr. Sloan, and he was accompanied by Messrs. Lowdell (in charge of the party), Mitchell, Fell, Wrenn, Leech, Muir, Ganson, J. P. Thomas, Pickett, Morris, Thomas, Jackson, Heathcote, Radlett, Pralle, Jauncey, Stratford, Palmer and Walker. Numbered among the members of this large crew were specialists concerned with maintenance and performance, and, as might be expected, a Rolls-Royce representative was included to look after the Darts and their performance.

In the flight-test schedule for tropical trials one first reads of the type of data to be recorded, and instructions are then given regarding the need for special attention to be paid to power output and flow-rate variations for the Dart turboprops when water/methanol is being used, and also to the operation of the fuel trimmers and to the jet-pipe temperatures.

On the subject of ground handling of the aircraft, the pilot was asked to comment on landing-gear behaviour on various airports, on steering (particularly during engine-cut tests with the aircraft loaded to aft c.g.), and on braking.

It may be recalled that the prototype Viscount 630 had expanding brakes, but the 700 is equipped with disc brakes; incidentally, since the tropical trials were completed Maxaret non-skid



(Left) The second call after leaving England was at Luqa Airfield, Malta. (Below) The inevitable but still impressive photograph when the Viscount 700 flew over Mount Kilimanjaro.

PREPARING THE VISCOUNT . . .

equipment has been fitted. Records show that of the four tyres new for the Farnborough Display in 1950, the last was changed at Nairobi before leaving for home. This meant that approximately 80 landings had been made, including all the tropical tests.

Nothing unusual was demanded during the take-off and landing tests, although these were of a particularly comprehensive nature. The pilots were asked to comment, for example, on the approach and the ease with which the round-out could be made during a power-off landing, bearing in mind the steep gradient and relatively large elevator stick-force involved under such unusual conditions for a four-engined airliner. In addition to the normal recordings made in the aircraft—I.A.S., engine r.p.m., altitude, aircraft weight, c.g. position and so on—the results of landing and take-off tests were recorded with a ground camera. The usual technique is for the pilot to make a normal short landing or quick take-off, and the camera, recording continuously, provides the 50ft-screen data.

Because of the poor condition of the runway at Nairobi, which has frequently been used for landing and take-off tests in the past, Wadi Seidna was used in the case of the Viscount. The altitude of Wadi Seidna is 1,256ft and the air temperature is generally higher than at Nairobi, the August average being 41 deg C (106 deg F).

The object of the take-off tests with four engines operative was, of course, to obtain figures for the minimum take-off distance consistent with recognized handling techniques. The c.g. position selected was the one giving maximum elevator loads. The aircraft weight for the first test was 50,000 lb; the wing flaps were set at 20 deg, and the landing gear remained extended up to 50ft. At least three tests were made in each of the selected configurations, both with and without water methanol. The Darts were set at 14,500 r.p.m. against the brakes, and the technique was to initiate "unsticking" at about 5 kt before the appropriate take-off safety speed, leaving the ground as late as possible to climb away immediately at a speed equal to the take-off safety speed. It was necessary to climb away sharply in order to prevent the speed building up over that desired.

For the take-off-with-engine-cut tests the weights, flap angle and technique were the same, but the c.g. position was altered to that critical for controllability. Water methanol was used, and a series of tests were made at engine-cut speeds of 100, 95, 90, 85 and 80 kt I.A.S., in that order.

Start-stop tests with engine cut were made for the same conditions and at the same cut speeds, and, as before, the critical engine, No. 4, was stopped by closing the H.P. fuel cock. It may be added here that while at Wadi Seidna the Viscount was taken off, flown round and landed without even starting the fourth engine.

Following the take-off and landing tests the schedule called for checks on climb performance and *en route* performance, and of level cruising. In practice some of these tests were made at any convenient point in the flying programme, regardless of the order laid down on the test schedule.

Climb measurements were first made with all engines operative and landing gear extended, the rates being recorded at 5-min periods, commencing at ground level and at 10,000ft for an aircraft weight of 50,000 lb. A further series of tests was made with one engine inoperative, both with wheels down and with them retracted, and figures were obtained for weights of 45,000, 47,500, and 50,000 lb. Some actual figures recorded were as follows :—

T.O. Climb

At 50,000 lb, four-engine operation, flaps 20 deg and chassis down, 105 kt. At S.L.—1,480 ft min at air temperature of 36 deg C.
At 10,000ft—1,000 ft min at air temperature of 12 deg C.

At 50,000 lb, three-engine operation, flaps 20 deg, chassis down.
At S.L.—680 ft min at air temperature of 39 deg C (102 deg F).
At 10,000ft—360 ft min at air temperature of 10 deg C.

En route performance checks called for measured rates of climb from ground level to ceiling in normal flying conditions, i.e., at maximum weight, I.A.S. 140 kt and with flaps and landing gear retracted. The engine speed for these conditions, without water/methanol, was 13,800 r.p.m. The same tests were made with one engine out and with two engines out. During a demonstration at Salisbury, Rhodesia, at a weight of 49,000 lb, the Viscount maintained height at 10,500ft with the two port engines feathered. For tests and demonstration purposes it is usual to cut the port engines in order to keep two of the three cabin blowers, (those to starboard), in use. The main point to note about the two-engines-out case is that the Viscount has shown that it could safely go round again at all European fields should it be baulked on landing, even though the two inoperative engines are on one side.

It is appropriate to mention at this point that the four engines have Rotol airscrews equipped for automatic feathering; the leading edges of the blades are electrically de-iced. During the tropical trials, the automatic feathering worked faultlessly on all occasions.

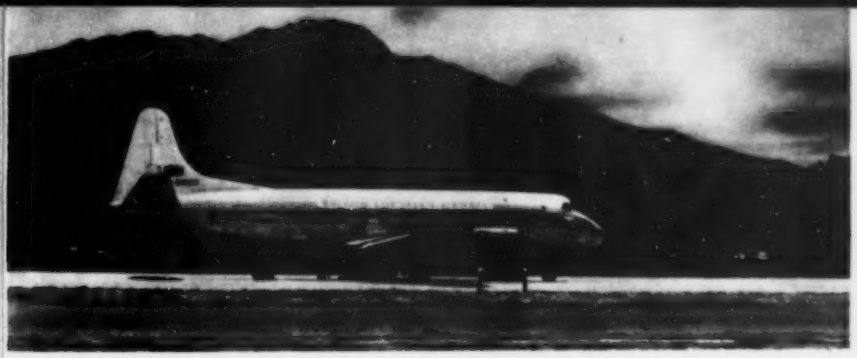
Under the heading of "level cruising performance" the requirements were simply to measure performance on three and four engines, at 40 and 48,000 lb weight, at altitudes of 5, 15, 20 and 25,000ft. Various engine r.p.m. settings were used down to the minimum with which level flight can be maintained. Checks (paying particular attention to jet-pipe temperature) were, in fact, made at 13,800, 13,400, 13,000, 12,000 and 11,000 r.p.m. Tests at all the above altitudes were repeated at 45,000 lb all-up weight.

The Viscount had arrived at Wadi Seidna on October 7th and a good proportion of the tests had been completed when it left for Entebbe and Nairobi on October 22nd. At Nairobi a few days were spent in completing tests and in certain cases repeating those which had already been carried out at Khartoum, at the higher altitude of Eastleigh Airport, Nairobi.

It was at this time that political troubles were being experienced in the Canal Zone and all tests involving use of water/methanol had to be postponed because the supplies did not arrive in time. For approximately two weeks from the beginning of November the Viscount made a series of flights in East, Central and South Africa for demonstration purposes, and in several cases these provided valuable operating experience.

Calls were made at Salisbury, Lusaka, Blantyre, Kasama, Entebbe and Johannesburg. Several demonstration flights were made at Salisbury and Johannesburg. According to reports—and this was before the Comet had started operating into Johannesburg—the reputation of British civil aircraft was not very high in South Africa (much adverse propaganda had been put out by foreign companies), but after some of the airline pilots and crews in that area had sampled the Viscount, they confessed that they were very favourably impressed. Passengers were apparently very pleased with the excellent view they obtained through the large oval windows, having previously believed that, with a highly pressurized aircraft, only small "portholes" could be fitted.

While the Viscount was based at Salisbury arrangements were



The terrain around Blantyre Airport, Nyasaland, is not particularly inviting for pilots.

made for it to fly over two of the routes operated by Central African Airways in order that that company might be better able to assess the aircraft.

On return to Nairobi on November 14th, after a short demonstration trip to Entebbe, trials were resumed and within a few days word was received that the Shell company had been able to deliver the methanol at Mombasa. Accordingly the Viscount was flown to Mombasa without delay and, as a result of some very energetic and efficient work by all concerned, 200 gallons were available on the airfield at 1 p.m. on November 20th, although the ship had only arrived in the river at 8.30 that morning.

When water/methanol is being used in the Darts (to restore power to the I.C.A.N. equivalent of 1,400 s.h.p. at sea level) the supply to the engine is automatically controlled, the pilot's only action being to operate the master switch in preparation. The unit governing rate of flow depends upon the balance between torquemeter and a spring. With the power lever in maximum r.p.m. position and the master switch on, water/methanol is injected into the Darts whether it be for take-off or, for example, in the event of a baulked landing. Provision is made in the Viscount for sufficient water methanol for one take-off, plus two baulked landings or overshoots, at maximum temperature conditions (I.C.A.N. + 30 deg). Some figures recorded during baulked landing climb trials and for take-off with water/methanol injection are as follows :

Baulked-landing Climb.—47,500 lb, four engines operating, flaps at 40 deg, chassis down, 100 kt I.A.S. At S.L.—1,180 ft/min at air temperature of 35 deg C. At 10,000ft—500 ft/min at air temperature of 13 deg C.

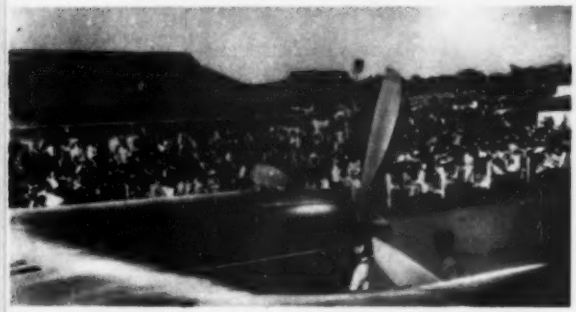
Preliminary-approach Climb.—47,500 lb, three engines operating, flap 30 deg, chassis down, 100 kt I.A.S. At S.L.—580 ft/min at air temperature of 37 deg C. At 10,000ft—110 ft/min at air temperature of 10 deg C.

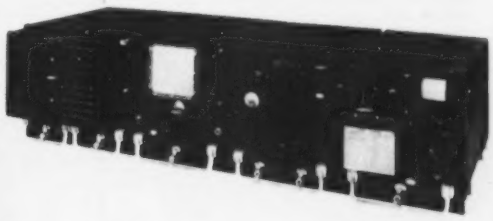
T.O. Performance.—Distance to 50ft with engine cut at critical speed of 86 kt, 1,470 yd. Height 1,250ft. Air temperature 38 deg C (100 deg F).

An examination of reports on what may be called incidental tests reveals that special equipment and instruments functioned satisfactorily. The ground ventilation system was found to be adequate for all normal airline conditions, but this is not to say that use of a ground conditioning truck is not better in the tropics. The pressure system gave no trouble, although one routine ground check at Wadi Seidna revealed that a filter was becoming blocked with sand; a remedy in detail design has since been found. In spite of warnings to tarmac hands and great care by crew, the pressure seals around the door frames were found to suffer damage from steps, so the seal has been transferred from the frame to the door itself. A special heat-resistant rubber is used.

A careful note was kept of the behaviour of the fuel-contents gauges and they were checked against the actual contents of the tanks. As a result, it was considered that the gauges are quite satisfactory for all normal purposes. The Smiths autopilot was another piece of equipment which received special attention; it functioned satisfactorily on all occasions, including periods of flight in rough tropical air.

Serviceability as a whole was remarkably good, and one of the only troubles experienced was the failure of No. 1 generator at Nairobi. However, it seems certain that there was good reason to expect such an occurrence, for most of the engine starting was done with the aid of internal accumulators. Starting entails a drain of some 1,000 to 1,200 amp, and an average of 92 starts were made with each Dart engine. It is estimated that, in the case of Nos. 3 and 4 Darts, 70 per cent of the starts were made on internal accumulators. In this connection it may be mentioned that on occasions the starts were somewhat slow, but, even so, the limiting jet-pipe temperature was never exceeded. Except for routine inspections and the attention required to this one generator, the cowlings of the four engines remained untouched for the 104½ hr of the trials.





(Above) The Standard Telephones S.T.R. 18 HF equipment, which gave excellent results during the trials. (Left) Large crowds cheered the arrival of the Viscount at Entebbe, Uganda's fine modern airport. The aircraft stayed to give a short but impressive demonstration flight.

Perhaps the most remarkable figure quoted in the results is the total oil consumption, for the four Rolls-Royce turboprops, of 8½ gallons. This is approximately two gallons per engine and gearbox per 100 hr, and, as provision is made in each engine for five gallons of oil, the whole trip could have been made safely without topping up. This experience confirms results obtained with the prototype during its European tours. In the same period as the 8½ gallons of oil were used, some 27,000 gallons of kerosine were burned.

Radio—While in Africa the Viscount carried a new type of H.F. R/T, the Standard Telephones STR.18, from which some excellent results were obtained. This set utilized the normal type of wire aerial, running in this case from above the wireless operator to the tail fin. During a test flight from Nairobi, Salisbury was worked on 11,360 k/c at 25,000ft, the distance being 1,200 statute miles. On November 26th, from a position 170 miles N.W. of Wadi Halfa, at an altitude of 20,000ft, and again on 11,360 k/c, London was worked, strength 2, and clear each way, and Malta strength 3 and clear. The distances involved were, respectively, 2,580 miles and 1,280 miles, and the time was 8 a.m.

In the afternoon of the same day, when flying 75 miles north of Benghazi, Karachi, 3,100 miles away, was worked, strength 3, clear. During the return flight to England, on November 29th, Malta and London were worked throughout the flight on the Malta-Nice leg, and, on the descent into Nice, London and Shannon were worked every 5,000ft at strength 5 for each station; and even on the ground at Nice contact was maintained with London and Shannon at strength 5 each way.

The V.H.F. equipment on the Viscount was the 70-channel STR.12A, which uses a standard whip aerial. This set also gave

(Left) Back at Hurn. L. to r.: D. Ganson, flight observer; D. Heathcote and D. Jackson, Rolls-Royce; Captain W. R. Mitchell, co-pilot, B.E.A.; W. H. Palmer, Dunlop; G. E. Lowdell, tour manager; J. Leach, design engineer. In climatic contrast, on the right, are seen Captain Wakelin and Captain "Mutt" Summers at Kastrup Airport, Copenhagen, during the Viscount's icing trial which followed its return from Africa.

PREPARING THE VISCOUNT . . .

good results and, for example, when flying from Nairobi to Salisbury, the latter station was worked satisfactorily at a range of 275 miles from 25,000ft on 118.1 m/c.

Conclusions.—It can be said that the Viscount's performances during the trials were well up to expectations, that serviceability generally was well above the average, and that the fuel-consumption figures for the Darts were very encouraging. It is understood that the adverse effect of tropical conditions on the fuel consumption of turbine-powered aircraft has, in all cases examined to date, proved to be less than had been expected.

The tabulated data (below) concerning transit flights over Africa give details of consumption and aircraft speeds. On the last four flights the fuel consumption was high as a result of headwinds and not, as might be imagined, due to a change in engine condition.

DATA FROM TRANSIT FLIGHTS

Date	Leg	Distance (st.m)	Fuel Used (gal.)	Time hr min	Block Speed (m.p.h.)
5.10.51	Hurn-Nice	660	688	2 25	273
"	Nice-Malta	665	675	2 35	257
6.10.51	Malta-El Adem	608	616	2 05	292
"	E.A.-Wadi-Halfa	830	779	2 55	283
7.10.51	W.H.-Wadi-Seidna (Khartoum)	425	508	1 45	243
23.10.51	Wadi-Seidna-Entebbe	1,105	1,125	4 10	270
"	Entebbe-Nairobi	320	417	1 25	226
31.10.51	Nairobi-Salisbury	1,210	1,170	4 25	274
6.11.51	Salisbury-Johannesburg	615	695	2 35	238
9.11.51	Johannesburg-Kasama	1,150	1,116	4 25	260
"	Kasama-Nairobi	730	807	3 05	237
23.11.51	Nairobi-Entebbe	320	425	1 20	240
"	Entebbe-Wadi Seidna	1,105	1,089	4 05	271
"	W. Seidna-Wadi Halfa	425	519	1 40	319
26.11.51	W. Halfa-El Adem	830	1,060	3 45	221
"	El Adem-Malta	608	769	2 35	235
29.11.51	Malta-Nice	665	875	3 05	216
30.11.51	Nice-Hurn	660	783	2 40	248

Weather was excellent for the trials in the Khartoum area, but at Nairobi heavy out-of-season rains made the runway surface tricky at times. Met. forecasting for transit flights was good at the lower altitudes, but the forecasting of upper winds was, to say the least, inadequate. In fact, on several occasions the Viscount itself was the only source of information on the winds above 20,000ft. On the Johannesburg to Nairobi sectors the only winds available were three days old.

Some exceptionally high cu-nim cloud was experienced on occasions; the tops were between 35 and 40,000ft, and the worst areas in this respect were between Khartoum and Entebbe. Here the weather was associated with the I.T.C.Z. and instances of cloud solid from 400ft to 20,000ft were experienced.

Naturally, the experience gained on the transit flights to the south was most valuable. An example of a typical flight-plan (for the Nairobi-Salisbury leg flown on October 31st) is given below in abbreviated form.

Fuel supplies created no difficulties at any time, thanks to the foresight of the companies concerned and, more particularly, to B.O.A.C. and their Comets. At Kasama, however, it was necessary to refuel from barrels—labelled "aviation turbine fuel."

Icing Trials

The Vickers Viscount 700 arrived back in England at the beginning of December on schedule + 7 days' wait for methanol, and no further tests were undertaken until the New Year. In March de-icing trials were commenced, in the first place from Prestwick, and some 48 hours of flying were carried out to collect the necessary data under various conditions of icing. It will be remembered that the Viscount's de-icing system relies upon air heated (but not mixed with) the exhaust gases from the inboard Darts. The airscrews and spinners, and the engine air intakes, are de-iced electrically, and fluid is used for the windscreens.

The severity of icing was measured during the test by what is known as the rotating-cylinder method, which involves the simultaneous exposure of three cylinders, of different diameters, to the air stream. For the Viscount trials the cylinders were mounted coaxially on a pole, which could be rotated from the cabin. The times of exposure of the cylinders to the outside air were observed and the "catches" of ice on each were weighed after the test.

As an example of one of the test results, we may quote Flight 15P. Glaze ice was encountered which increased in thickness from ¼in at 11,000ft to about ½in at 13,000ft, when the measured conditions were: engine r.p.m., 12,500; aircraft speed, 155 kt; true air temperature, minus 9.5 deg C. The airframe de-icing system was switched on and it took 4 min to clear the aircraft completely of all ice. No run-back was observed.

During this test No. 3 engine was not at first de-iced, and a build-up of approximately 1in was observed. Eight minutes after its de-icing system was switched on, a large piece of ice from the top of the intake "put the fire out." But the re-light was reported to be immediate and satisfactory.

On Flight 26P, when flying in ice at approximately 5,000ft, with wing supplies switched to one-third power, 2 min were required to clear the tail. After flying for 24 min in these icing conditions and with the system at one-third power, ice started to form on the leading edge of the tailplane. An increase to half power, giving supply temperatures of 115 deg C to the wings and 65 deg C to the tail, was sufficient to clear the ice. Conditions at the time were: altitude, 6,000ft; r.p.m., 12,000; true air temperature, minus 13.8 deg C.

The Viscount carries a stall-warning device, which was tested during the de-icing trials. On one occasion, when about ½in of ice was observed on the leading edge of the wing and the build-up extended for about 4in aft of the leading edge on the top surface (and can be assumed to have extended the same distance under the wing), the stall warning was tried out and functioned accurately. The de-icing system was then operated and temperatures of 75 deg C and 35 deg C were noted in the wing and tail supplies respectively. The stall-warning device was tried again and once more functioned accurately.

One more example can be quoted from these trials, when a build-up of rime ice on the tailplane, of approximately 1½in thickness, was cleared completely in 4 min by the use of the de-icing system at full power. The altitude on this occasion was 12,000ft; the r.p.m., 12,300; the air speed, 170 kt; and the true air temperature, minus 9.5 deg C.

EXAMPLE OF ABBREVIATED FLIGHT-PLAN

VISCOUNT 700—G-AMAV: NAIROBI-SALISBURY. DIST. 1,052 N.M. MET. BROKEN CU. 3/8 TO 5/8, 6,000-12,000FT. W/V FOR 20,000-25,000FT, 100/10-15 KT. ROUTE—DIRECT. FLIGHT TIME—4.15.

GMT.		
0712	AIRBORNE	CLIMB TO 20,000FT. TAS. 170 KT.
0754	LEVEL	DIST. GONE. 120 N.M.
0837	FIX (VISUAL)	TAS. 255 KT. TEMP.—12° C. 5,260 KT. W/V 090/10 KT.
0840	CLIMB TO 24,000FT	
0849	LEVEL	TEMP.—18° C.
0937	FIX (VISUAL)	G/S 253 KT. ETA ZAMBESI 1100 HR.
1058	ZAMBESI	G/S 258 KT. ETA SALISBURY 1140 HR. W/V 080/10 KT. ETA DESCENT 1115 HR.
1114	COMMENCE DESCENT	1,101 GALLS. GONE
1136	SALISBURY	
1140	LANDED	

FLIGHT TIME, 4.24. AVERAGE GROUND SPEED, 240 KT. TOTAL FUEL USED, 1,195 GALLS.

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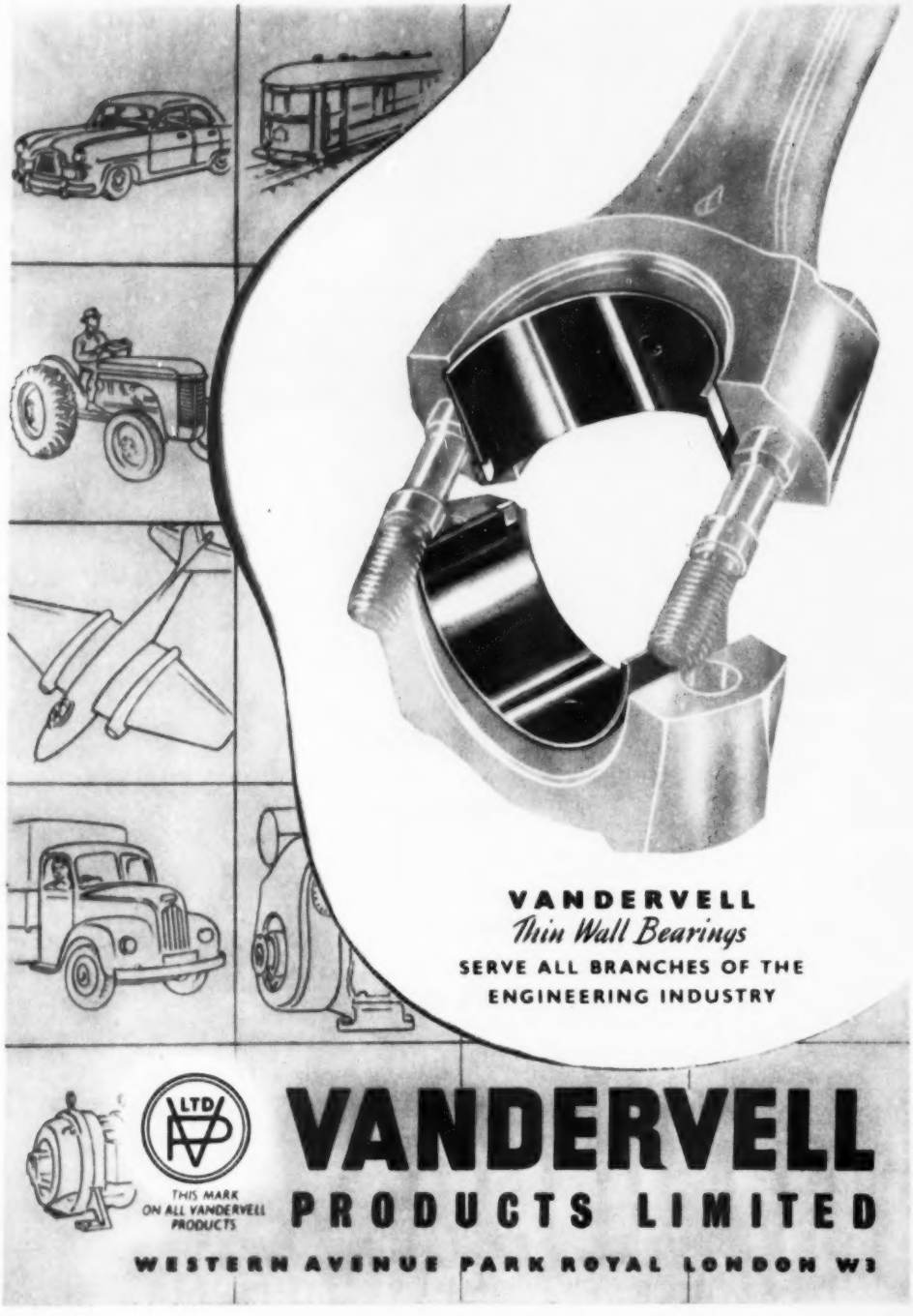
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GOVERNMENT COLLABORATION

—*in Aircraft Development: An Informative Lecture by a Senior M.o.S. Official*

Mr. S. Scott-Hall, C.B., M.Sc., F.C.G.I., D.I.C., F.R.Ae.S.

AMONG papers prepared for the National Aeronautic Meeting of the Society of Automotive Engineers held earlier this year in New York, was one of singular interest to British readers also, and it is now possible to publish a summary. The subject was *Government Collaboration in Aircraft Development*, and the author was Mr. S. Scott-Hall, C.B., M.Sc., F.C.G.I., D.I.C., F.R.Ae.S., Director-General of Technical Development (Air), Ministry of Supply. Mr. Scott-Hall was, through illness, unable to deliver his lecture in person, the paper being read for him by Mr. Shaw, of the British Supply Mission in Washington.

It was interesting, said the lecturer, to speculate on the probable course of aviation had the aeroplane had no significance from the national point of view. Not only might technical development have been very different from what had taken place but it was certain that it would have been incomparably slower without Governmental participation. In fact, so costly was the development of most aircraft today that it could not be done without government help.

The development of military aircraft called for knowledge and experience beyond the powers of command of a private organization. In the United Kingdom it had for some time been felt that this was largely true for civil transport aircraft also, and recent legislation led one to believe that the United States was also beginning to come round to this way of thinking.

The time appeared to be past when a firm could develop an aircraft as a private venture; except for the case of light aircraft, official support was now required for carrying a proposal into the prototype stage. As an instance of this, the 47 prototypes exhibited at the 1951 S.B.A.C. show included 39 developed partly or wholly under Ministry of Supply contract.

Having thus established the precept that governments were the only authorities possessing money and resources capable of developing complete military—and, perhaps, civil—aircraft, the question of control at once arose. In Mr. Scott-Hall's opinion, we had in Great Britain a government organization in collaboration with private enterprise which not only controlled wisely and without duplication of effort, but also developed along the most profitable lines without wasting the taxpayer's money. It rested on the following principles : only one department was responsible for research, development, and production of all aircraft and associated equipment; close liaison was maintained between Service personnel and administrative and technical civil servants of the Department, and between the Department, the industry, and the "customer"; the professional scientists and engineers of the department also had *control*, as well as execution, of undertakings, which were thereby stabilized by continuity of their appointments; and the best possible use was made of "external" scientific advisers.

At the present time, the Ministry of Supply had very wide responsibilities for the provision of weapons to the Services, the Admiralty alone retaining a measure of direct control of its supplies. The M.o.S. was the sole agency for the development and production of Service aircraft and also undertook development of aircraft for the airline corporations—although the latter could place contracts direct with industry if they so wished. The Ministry was also responsible for all aircraft equipment, although the M.C.A. played a part in the specialized field of air traffic control ground equipment.

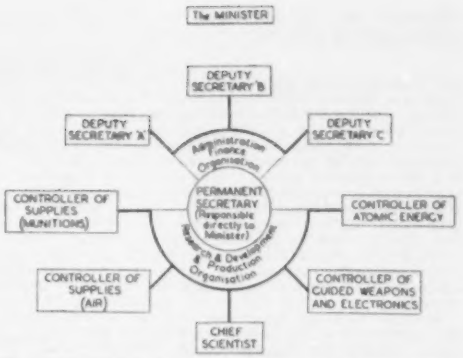


Fig. 1.—Ministry of Supply Organization. The three Deputy Secretaries of the Administration and Finance Organization each deal with a selected number of distinct items.

Although the M.o.S. dated only from 1946, unified control of air research and development had existed virtually throughout the history of British aviation; from 1940 it was in the hands of the M.A.P., and before that with the Air Ministry itself. The present arrangement (Fig. 1) was one of close liaison with other divisions —guided weapons, for example—under general control of the Research and Development Board.

The head of the air side of the M.o.S., the Controller of Supplies (Air), was an Air Marshal and member of the Air Council; only a man with such background could have the training and experience required, or could command the confidence of "customers." He was responsible for production and inspection, and exercised control over research and development through two senior civil servants (the Principal Director of Scientific Research and the Director-General of Technical Development) who jointly headed a number of directors who covered the whole aeronautical field, except for electronics (Fig 2).

The R and D directors were responsible for the strategic direction of work by their departments, the programmes arising either from "customer" requirements, or from "self-generated" research. The work could be undertaken by the Ministry's experimental establishments, or by industry. The M.o.S. establishments of particular interest to aeronautics were : R.A.E., Farnborough; N.A.E., Bedford (which eventually would take a great deal of the aerodynamic and structural work from R.A.E.); A.A.E.E., Boscombe Down; T.R.E., Malvern; and N.G.T.E., S. Farnborough.

The degree to which these establishments devoted their energies to advising industry, rather than developing complete equipment themselves, depended largely upon the strength of the industrial field concerned. Competition between official establishments and private companies was avoided by encouraging the latter to take over as much R and D work as they could handle.

The research and development work undertaken by Canada and Australia was a valuable contribution to the Commonwealth; in particular, the winterization unit at Edmonton and work of the N.R.C. in Canada were mentioned by Mr. Scott-Hall, as were the facilities for guided-weapon testing which were being prepared in Australia. The Ministry of Supply was closely associated with these activities.

History would give great credit to the early leaders of the Royal Air Force, who realized, long before any other military service anywhere in the world, that to give their Service the best equipment they would have to engage high quality civilian scientists and engineers. They also appreciated that, to do this, these men could not serve as advisers only, but as executives—with adequate remuneration. The continuity of outlook and direction accruing from the permanent appointment of these men was also realized. Thus it was that research and development was today largely in the hands of civilians, although military officers were not excluded. Generally the "best man for the job" dictum was followed.

Financial control was exercised by a special branch working closely with the technical directors and heads of establishments. The arrangement ensured that all expenditure was scrutinized before submission to the treasury, and that all financial negotiation was undertaken by those trained to the work—leaving technical staff free from the task of arguing their case with those unfamiliar with their work.

The fact that the head of the air side of the M.o.S. held a seat on the Air Council at once assured unity with the Air Ministry

GOVERNMENT COLLABORATION . . .

and Royal Air Force, while additional contacts at all levels further linked the Ministry with that Service. Also within the M.o.S. there was a Chief Naval Controller, an Admiral, who was Vice-Controller (Air) at the Admiralty; the War Office, however, presented its air requirements through the Air Ministry. But executive and committee contacts were strong with all three Services. The M.C.A. had a representative attached to the M.o.S. and there were inter-departmental committees and many informal contacts with civil operators.

Relations with industries were as close and cordial as they could be; they were furthered by M.o.S./industrial committees like the Gas Turbine Collaboration Committee. It was M.o.S. policy to acquaint equipment manufacturers with the aircraft industry—with beneficial results anticipated; a more difficult task was the creation of new industries to meet new needs, of which the demand for complex air-safety equipment was an example.

External scientific advice was available from the Aeronautical Research Council, six of whose members were, however, M.o.S. employees. Established in 1909, the A.R.C. was not an executive body, but could advise upon any aspect of aeronautical research.

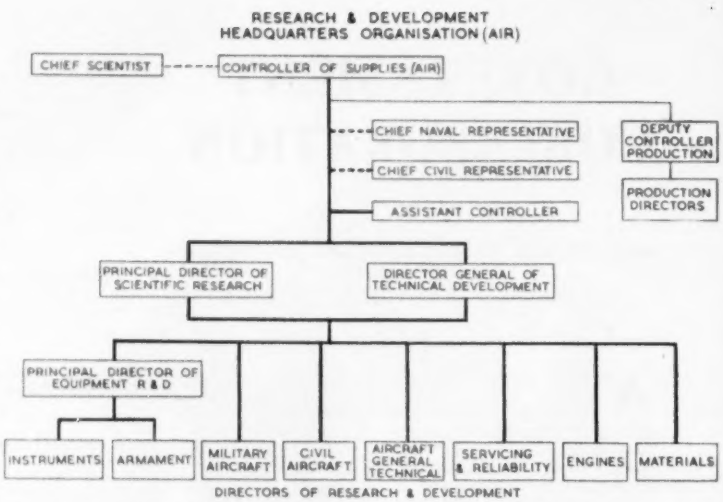


Fig. 2.—The family tree of the Research and Development headquarters organization (Air) of the Ministry of Supply.

It had always been the aim of the M.o.S. to keep at least 10 per cent of its scientific manpower working on fundamental research; one of the greatest current problems was preventing diversion of manpower to short-term projects. The value of long-term research was strikingly illustrated by the work, between 1920 and 1926, of A. A. Griffith on axial compressors, and by that on drag reduction conducted for many years by Professor Sir Melville Jones.

The stimulating effect of research activity had promoted the introduction of research teams even at testing establishments. Research contracts were also frequently placed with the Universities and with industry; the former largely undertook non-secret work—so that the results could be freely discussed—while prominent among industrial contracts were those for research aircraft.

Modern aeronautical research called for more expensive equipment than any other activity—except, perhaps, atomic energy—and, when money was limited, very careful judgment was needed before large commitments could be made. There was, for example, an ever-increasing risk that wind-tunnels would be obsolescent before they were completed. Since 1942, the country had relied upon the single, but excellent, Farnborough high-speed tunnel. Plans had been formulated at the end of the war for assisting firms to build a standard type of large tunnel; this had been dropped for financial reasons, but the S.B.A.C. had since announced a scheme for joint participation of a number of firms in a 35,000 h.p. tunnel *à la* co-operative tunnel at Caltech. There would also be at least one large, and several small, supersonic tunnels at the N.A.E. at Bedford.

Expensive equipment was also demanded by structural testing and power plant development. Large test-frames were plentiful in the industry and great enterprise had also been shown in the installation of compressor plant for gas turbine development; but M.o.S. pioneering in both scale and technique had been shown by providing advanced equipment at the R.A.E. Underwater testing of fuselages for pressure, and later, combined pressure and flight loading, was an example of this pioneering in technique.

The success of any new aircraft depended largely upon the soundness of its original specification, which had to strike a balance between the obsolescent and the impossible. It also had to strike a balance between defining every detail and broadly calling upon a firm to defend the State! Usually a design study submitted by aircraft designers was examined for weaknesses before a requirement was drawn up in detail, the final specification being the result of close collaboration between the user, the M.o.S. (as technical agent) and the designer.

Suitable firms were usually invited to tender, but the whole industry received a copy of the specification for information. The merit of the designs submitted influenced the choice made by the Ministry, but the ability of a firm to develop, and to deliver in quantity, was also borne in mind.

In the inter-war years when design was a cheaper and more uncertain business than now, it was customary to place the same contract with a number of firms and hold a "development competition". Not only did this facilitate the selection of a really good prototype, but it enabled many more design teams than would otherwise have been economically possible to be kept in employment, so preserving a strong industry.

Today, however, not only was a design "failure" most unlikely, but, indeed, all designs built to the same specification were likely to evolve very similar to one another. Moreover, quite apart from vastly increased development costs, the increased complexity of equipment, performance and handling trials now often called for a multiplicity of prototypes of the same aircraft.

During design and prototype construction, M.o.S. help was available on all aspects of the undertaking; the larger firms, in fact, were assisted by a Resident Technical Officer. Three important meetings at this period were the advisory design conference (detail requirements), the mock-up conference (interior arrangement), and the final conference (at which the first completely equipped aeroplane was examined against the specification).

The time and effort required by prototype testing had grown alarmingly in recent years. In the past this work had been conducted at a government establishment, duplicating much of the flying already performed by the manufacturer. The solution to the increasing complexity of the operation had been found in the expanding technical strength of the firms themselves, who could now be left to do most of the flight testing unaided.

As more and more firms became competent to do this work, so the load carried by government establishments was relieved. This was especially true of military types, but the M.o.S. had made a valuable contribution to the development of civil transports by testing all the civil prototypes which it had ordered and by developing civil test-techniques. Civil aircraft were, of course, responsible (from the C. of A. viewpoint) to the A.R.B., a body answerable only to the M.C.A.

Prototypes were paid for out of the M.o.S. allocation for research and development, production aircraft being charged against the department concerned. Civil prototypes for the M.o.S. were gradually written off against amortization over a given number of the production aircraft. Design rights rested with the constructor, although the Ministry reserved free use of the design. The advantage of this arrangement was that, without hampering Governmental use of a design, the manufacturer could, security permitting, sell the type to a foreign power. But if he did so, the M.o.S. could demand payment of a royalty to help cover development costs.

Because the ability of a firm to attract development work was largely influenced by its reputation; because of the limited work offered in peacetime; and because of the length of the development/production cycle in modern aircraft, there was a tendency for work to be concentrated in those firms whose prestige stood highest. This unhealthy state was accentuated by the increasing

complexity of aircraft, which resulted in fewer new types being ordered. It was most difficult to spread the load reasonably and for some years the M.o.S. had collaborated with the industry in planning aircraft development systematically; the methods employed had been described elsewhere.

It was generally recognized that, whilst a government could not avoid general control over development, it should on no account attempt any control over the details of the design itself. This was the sole prerogative of the manufacturer, and the competence of the design staff was checked by a Design Approval Scheme. Before the first flight of the type, the chief designer would be required to sign a statement to the effect that the specification had been met, this responsibility also extending to proprietary equipment contained in the aircraft—but not to government-furnished equipment.

Engine development was characterized by the absence of stated operational requirements, which led to freedom for design. The engine manufacturers worked closely with the aircraft firms to gauge future demands, in which work they were assisted by M.o.S. specifications which outlined likely future requirements. British engine development costs had always been met by separate contracts, unlike the traditional U.S. method of financing development privately out of production. The British method had much to commend it, bearing in mind the great cost of gas turbine development; in fact, it was being extended to provide distinct contracts for engine-running only.

The policy of encouraging industry to undertake development work had nowhere been more difficult to implement than in the field of aircraft equipment and the increasing introduction of electronics had aggravated the position. There was a natural disinclination on the part of firms to undertake defence projects where the scientific effort required was rewarded poorly in comparison with the domestic market. Moreover there had been a dearth of research engineers of the calibre and specialized knowledge required to make a success of work on air equipment.

Early radar development had been confined to one government establishment to meet the urgent demands of war; now that so much instrumental equipment was required, the difficulties of finding the necessary capacity were very great. The problem was being tackled by encouraging education authorities to improve their courses of training in the techniques required; by ensuring that contracts offered the greatest incentive from the production viewpoint; and by ruthlessly eliminating duplication of effort.

Aeronautical development was not amenable to easy planning; the vagaries of weather and unserviceability interfered, and a plan extending over months could be shattered by one flash of inspiration. The three Services had jointly evolved a system of priorities on a uniform basis; estimation of the effort and time required for a project was being made with increasing accuracy, enabling the order-book to be balanced against available resources.

The air side of the M.o.S. also had to assist in standardizing components and parts on a progressivley larger scale; it had extended to the Tripartite Air Standardization Scheme (R.A.F. R.C.A.F., and U.S.A.F.), and had now spread to include the whole of NATO. The department collaborated with the services and civil operators in running the Modification organization, and the dissemination of secret information to authorized persons was another activity in which the M.o.S. kept in close touch with other countries.

Mr. Scott-Hall's paper closed with the following conclusions: "The part played by the British Ministry of Supply in the development of aircraft may appear paradoxical in the sense that it strives for centralized government control and then does its best to delegate its work to private enterprise. Nevertheless, the system is one which has stood the supreme test of war and emerged with credit. There are certain essentials for it to be successful. First, it must be flexible. Secondly, it must have the complete confidence of industry and 'customer' alike. It must be democratic."

THE SIDDELEY TROPHY RACE

THE Siddeley Challenge Trophy Race will be flown from Coventry Civic Aerodrome (Baginton) on Saturday, August 23rd, 1952, and is being organized by the Coventry Corporation in conjunction with the R.Ae.C. and Coventry Aeroplane Club. It will be the last of the 1952 National Air Races to be flown, and the results will count towards the Jubilee Trophy.

Regulations and entry forms may be obtained from the Organizing Secretary, Siddeley Challenge Trophy Race, 1952, Council House, Coventry, to whom entries must be submitted by not later than August 8th, 1952.

The race will be the main item in the programme for the Coventry Air Day. An attractive flying programme is being arranged, which will include displays by the famous Patrouille D'Etampes aerobatic team and by aircraft of the Royal Navy and of the Royal Air Force. The official opening will be performed at 2.30 p.m. by Sir Miles Thomas, chairman of B.O.A.C.

CIERVA MEMORIAL PRIZE WINNER

THE Cierva Memorial Prize for 1951-52 has been awarded by the Council of the Helicopter Association to Mr. L. H. Hayward, patents and commercial engineer of the Fairey Aviation Co., Ltd. This is the second time since the prize was initiated in 1946 that a Fairey technician has been the winner—in 1947-48 D. R. Garraway, of the same company, became the first to achieve this technical honour.

The prize commemorates the work of Juan de la Cierva, who was killed in 1936. It is open to international entry to anyone under the age of 35.

The substance of the winning entry is implicit in its title: *A Review of Helicopter Patents*. A digest appeared in *Flight* of January 18th and 25th last.

Mr. Hayward served as an apprentice with the Bristol Aeroplane Co., Ltd., and later on the staff of D. Napier and Son, Ltd. He rejoined the Bristol Company and went to Fairey Aviation in 1950.

BULKY YET SHAPELY: AMERICA'S BIG INVESTMENT

Now back at Boeing Field, Seattle, after a successful preliminary flight-test period, the YB-52 is seen to be as slim as its six-jet forerunner, the B-47. The U.S. Air Production Board has just recommended large-scale production of the YB-52; B-47 production will continue at a high rate.

Our American Correspondent Reports . . .

IN a recent issue of an American aviation magazine an airport operator took a full-page advertisement, complete with photograph, to announce that he held a sales agency for de Havilland Doves and was equipped to service them. This was a sharp reminder of how much things have changed since 1948; then, a forecast that such advertisements would appear four years later would have been derided. Yet today nobody thinks it remarkable that an American operator should sell, service, or advertise British aircraft.

The Americans may be unhappy that there is no adequate home competitor to the Dove, but their envy is a pretty generous one. The sight of such a machine on an airport no longer draws the crowd it did when the British Embassy Dove first flew around the States in 1950 with its crew spreading the gospel of British achievement.

This acceptance is largely due to the fact that during the last two or three years our lead in gas turbines and jet transports, the consistent excellence of the S.B.A.C. Show with its message of technical progress, and the more knowledgeable articles in the American Press, have all brought about a better understanding and wider acclaim of British products.

Moreover, there seems to be no reason why this very desirable improvement in understanding should not continue. Certainly it looks as though there is room for it to do so in the field of feederline and executive transports. One sometimes wonders whether British manufacturers and trade promoters appreciate the possible market that exists for such types in the United States. Although the Prince and the Marathon (and even perhaps the current version of the Heron) are not really "modern" machines, they are still without competitors here, and presumably there are developments of these types, suitable, possibly for turboprop power, which could continue the good work when existing versions have become obsolete.

• • •

IN the era Before The Dove, when that excellent aircraft the Beechcraft D.18S had it all its own way, almost any Britisher one talked to (other than the few who were really in touch with the American market) was inclined to scoff at the idea of ever selling British machines in the States. Even today, in talks with visitors from Britain, one gets the impression that some of this conservatism remains, and there is a tendancy to cite current difficulties as excuses for not tackling the job. Admittedly, the calls of rearmament are paramount, and the expense of sales and spares and overhaul organization so far from home is considerable. Also, it's obviously more attractive (and satisfactory to stockholders), for manufacturers to be able to rely on military orders.

But these considerations are of a passing nature, and with the chance of a market here in America it would be unforgivable if Britain lost it for lack of trying. One has only to talk to our Attachés and others who are flying a Dove and a Prince around America to realize the interest that is taken in those types. Indeed, the former are so sought after that the second-hand value of a Dove today is remarkably high; one of the larger engine manufacturers here (who were forced to sell their Dove because it proved too small) got more than their money back on it.

Maybe one is maligning the British industry with these remarks, but, viewed from the open spaces of the Mid-West, where Americans are openly expressing interest in our types, that's how it looks. And certainly only one of our manufacturers has so far gone into such an operation, found it successful, and captured part of this worthwhile source of dollar revenue.

• • •

PROBABLY the easiest market to break into here would be that which supplies the executive—or V.I.P.—aircraft. The excess-profit tax laws make it an advantage to own a company aircraft. Also, their are plenty of airports, and radio aids, and these, combined with the vast distances, give real utility. The prestige associated with arriving in his own machine makes it a popular idea with any manufacturer who has a continent-wide business. And there are plenty of such manufacturers. *American Aviation*, in their issue of June 23rd, published an interview with a Mr. Cole H. Morrow, chairman of the board of the Corporation Aircraft Owners Association, an organization created solely to look after the interests of executive-aircraft operators. Some interesting facts emerged. There are some 1,700 executive-owned twin-engined aircraft in the United States. These range from Convairs, through DC-3s, Lodestars, Doves, to Beechcraft, with a fair proportion of suitably modified B-25s, B-26s and B-17s, to say nothing of some hundreds of single-engined Navions and Bonanzas. A few firms have big fleets, and even contract to outside companies for their maintenance.

The annual expenditure on this type of operation is in the neighbourhood of 30 to 50 million dollars, and the capital investment as high as 175 million. Of this latter, the de Havilland Dove must by now have captured a modest four million or so in sales of aircraft and spares. Moreover, it is the general opinion that this market will expand, as it is felt that it is under-developed for the amount of potential business available. Whether it grows or not, however, there is no question that the present types must soon be replaced with modern and economical aircraft. So far no American aircraft manufacturer appears to be in the position where he can fulfil such a demand. Maybe we can; at least we should try.

• • •

IT is this correspondent's feeling that two types of aircraft would be needed for this market—one a small, fast, economical and comfortable V.I.P. six-seater, the other a larger machine of maybe 28,000 lb. or so. This latter falls also into the feederline category, the requirements of which are not necessarily the same as for a truly executive type. But for V.I.P. work it would be better to have a really "good" aeroplane, which could be developed, rather than one designed to maximum airline requirements (a limitation which often removes much of any subsequent "stretch"). In each case consideration should be given to possible use as a cargo carrier, a requirement which the Percival Prince fulfils admirably because of its large and low door-position.

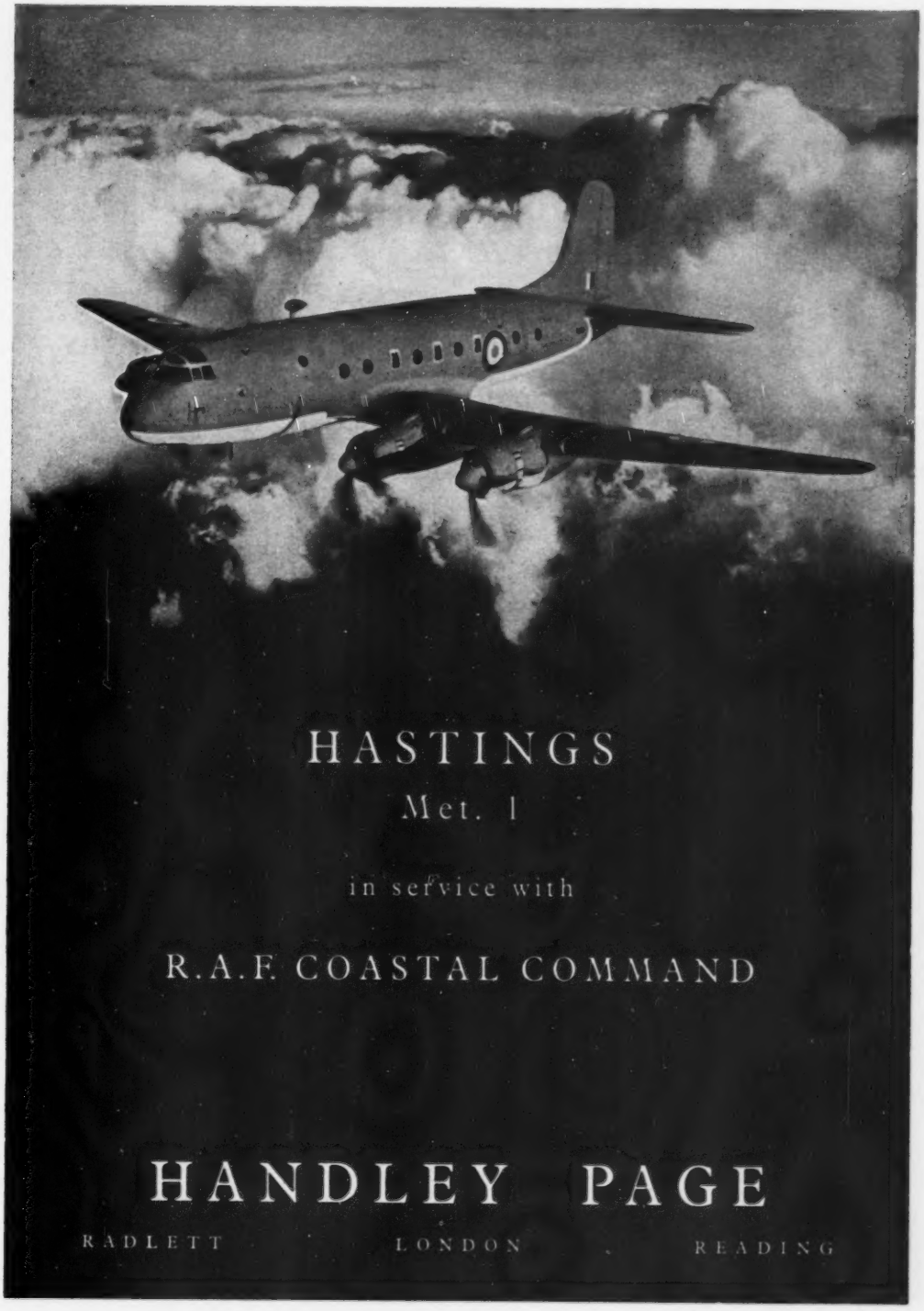
Both types must be designed to take the maximum of navigational and radio equipment, for the executive pilot is called upon to do a lot of bad-weather flying. Overall economy in operation is, of course, necessary, but a high utilization may not always be achieved—perhaps 600-1,000 hours per year. Good take-off, landing and instrument and handling characteristics are needed, for not only do executive pilots have to fly in some pretty dirty weather, but into airports that are unfamiliar to them, some of which are small and poorly equipped (not every airport here is an Atlanta or a Washington).

For this same reason the engines fitted should be able to use the lower grades of aviation fuel, and not be limited to 100-octane or over. Servicing will most often be done by the pilot himself, or hired labour if away from base, so the engines and controls, etc., must be readily available without the use of special equipment, or steps, or ladders. Everything must be simple and get-at-able (the Dove is ideal in this respect). Many of the distances to be covered will be great, so that a high speed, a good range (say, 1,200 miles with reserves) and adequate pilot-comfort are all essential. Any aircraft which can offer these advantages will be a strong contender for the dollars which Mr. Morrow suggests are available.

• • •

POLITICS, with as big a capital P as the Editor will allow, is the motivation for much which is being said and done here today. It will continue so until after November. If the American election picture seems rather obscure, or long drawn out, or sometimes rough and unattractive, it is nevertheless a period when the country's political liver gets a good healthy shaking up. Almost anything is grist to the political mill, and if innocent people on the sidelines sometimes get hit by flying verbiage, so do the participants.

The Congressional aviation picture itself has already under-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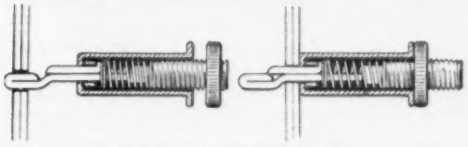
OUR AMERICAN CORRESPONDENT REPORTS . . .

gone a slight change as a result of the defeat of Senator Brewster of Maine in that State's primary elections. Senator Brewster, who has had a front seat on the aviation bandwagon for some time now, was chairman of the Congressional Aviation Policy Board, and an active member of the Senate Interstate and Foreign Commerce Committee (before which body any new aviation Bill is examined and reported upon prior to its submission to Congress). He was also said to be the champion of Pan American's "chosen instrument and All-American flag-line" policy, besides being an inveterate twister of the British lion's tail.

But his flights into aviation have not always been successful. Some readers may remember one of his more abortive forays, when he tangled with Howard Hughes during a Congressional investigation into the latter's U.S.A.F. contracts. At that time Mr. Hughes held (and still does hold) big interests in Trans World Airlines, and it was reported that there was a suggestion that if Mr. Hughes would amalgamate his airline interests with P.A.A. (thereby smoothing the way for a chosen instrument) the investigation might be—er—less intensive. Apparently this idea didn't appeal to Howard Hughes, whom the American magazine *Reporter* once described as "a man who gives the impression that he quit believing in human nature at the age of five when he found out the things people would do for a small part of his millions." In fact, he resisted the suggestions with such effectiveness that he thoroughly discomforted the Senator from Maine, who decided he had pressing business elsewhere, adjourned the investigation and, as far as one knows, never re-opened it. So today T.W.A. competes on even terms with Pan American, and Mr. Brewster will, come the 83rd Congress, no longer be the Senator from Maine (although he might conceivably appear in some government rôle should the Republican Party be returned to power.)

LOCATING RIVET HOLES

FROM Silentbloc, Ltd., Victoria Gardens, London, W.11, manufacturers of flexible bearings, anti-vibration mountings, flexible couplings and other resilient components, comes an announcement that they have acquired the sole manufacturing and distributing rights of the Interlock Locating Pin in the United Kingdom and British Commonwealth.



How the pin is inserted and locked.

The pin is employed in the aircraft industry principally as a clamp for skin-riveting work; the method of operation is apparent in the accompanying drawings. It can be inserted or withdrawn with one hand, and additional clamping pressure is available by tightening the knurled ring. Pins can be supplied for rivet holes of 3/32in, ⅛in and 5/32in diameter.

CERAMIC-COATING "HOT" PARTS

THE Solar Aircraft Company of San Diego, California, the well-known fabricators of "hot" components for gas-turbine and other applications, have prepared a brochure describing and illustrating their "Solaramic" coating process for the protection of such components in service.

Primary advantages claimed for these ceramic coatings are (1) that, by preventing burning, they lengthen the service life of parts operating at normal temperature ranges; (2) that, alternatively, they allow parts to operate at their existing standard life but at higher temperatures; (3) that they permit the substitution of lower-grade alloys, less rich in "strategic" elements.

The process involves three basic operations: manufacture of the coating material; preparation of the surfaces to be treated; and coating and firing. Manufacture starts with the weighing and mixing of the raw material, which consists of metal oxides and fluxing agents. The blended mix is placed in a rotary furnace and smelted at temperatures ranging between 2,200 and 2,700 deg F. During this period the components of the mixture fuse into a homogeneous molten liquid.

This melt is then chilled in cold water, the quenching producing a material called "frit" and having an appearance resembling that of crushed glass. The rapid cooling produces internal strains in the material and facilitates its reduction to a fine powder in subsequent milling operations.

The frit is placed in a drying chamber where all excess water is removed by evaporation. It is then ready for grinding in a ball mill, where the particles are crushed. Water, clay and other binding agents are also added.

After the aggregate has been reduced in particle size to the requisite fineness and uniformity, it is a rather viscous liquid called "slip". It may be thickened or thinned as desired for the actual coating operation.

In this next operation painstaking cleanliness is a major factor. All traces of welding flux, pickling films, and heat-treat scale must be removed from the metal surfaces; grease, oil, and even fingerprints are detrimental to successful coatings.

Following degreasing operations a part may alternatively be sandblasted or acid-etched to produce a roughened surface which improves the bond strength.

Either spraying or dipping, according to the design of the parts, may be used for the coating process, and in most cases a single coating is sufficient.

The treated part is placed in a drying cabinet until the coating is dry, typically at 250 deg F for 30 min. Since the unfired coating, called by the potter's term a "bisque," may be damaged by rubbing action before firing, careful handling at this stage is essential.

When dry, the components are racked and placed in a furnace, where they are subjected to a firing temperature between 1,500 and 2,000 deg F for a predetermined period of from 10 to 30 min, depending on the size and nature of the parts. Upon removal they are allowed to cool, and the finished coating is then ready for inspection.

"Solaramic" coatings are now commercially available from Ferro Corporation, 4150 East 56th Street, Cleveland 5, Ohio, who have been licensed by Solar to manufacture and sell the coating materials or frits.

ELECTRICAL STANDARDS

THE third booklet, *Electricity*, in the series *Units and Standards of Measurement Employed at the National Physical Laboratory*, has recently been published by H.M. Stationery Office* for the Department of Scientific and Industrial Research.

Among the subjects dealt with are current, voltage, resistance, power, energy, inductance, capacitance and frequency. An historical account is included, and also a section on radio frequency standards. The booklet defines the units employed at the N.P.L. for the measurement of electrical quantities, and the standards by means of which these units are determined and preserved.

**But obtainable only from the National Physical Laboratory, Teddington, Middlesex, price 9d. (by post, 10½d.).*

FORTHCOMING EVENTS

Aug. 2. "Daily Express" Challenge Trophy Race.
Aug. 2-3. "ILSY" Air Display, Ypenburg.
Aug. 3-4. S.M.A.E.: National Model Aircraft Rally, R.N. Air Station, Gosport.
Aug. 13-17. Nordic A/2 Models Contest, Austria.
Aug. 15. Aéro-Club de Charente Maritime: Laleu and La Rochelle Air Meeting.
Aug. 15. Ailes Montlieonnaises: Rally.
Aug. 16. Aéro-Club de Vendée: Sables d'Olonne Rally.
Aug. 23. Coventry Aeroplane Club: Air Day and Siddeley Challenge Trophy Race.
Aug. 23-24. Aéro-Club de Trente: Dolomites Circuit.
Aug. 30. Midland Aero Club: Display.
Aug. 31. A.B.A.C.: Summer Convention.
Aug. 31. S.M.A.E.: British Model Championships, College of Aeronautics, Cranfield.
Sept. 7. Scandinavian Air Rally.
Sept. 1-7. S.B.A.C.: Flying Display and Exhibition, Farnborough.
Sept. 7. "Yorkshire Evening News" Model Flying Festival, Sherburn-in-Elmet.
Sept. 15. Battle of Britain Day.
Sept. 15. I.A.T.A.: Eighth Annual General Meeting, Germany.
Sept. 17. Golf: R.N. and W.R.N.S. v. R.A.F. and W.R.A.F., Camberley.
Sept. 20. R.A.F. At Home Day.
Sept. 21. S.M.A.E.: Models Contests, Butlin's Holiday Camps.
Sept. 28. Aéro-Club de France: Coupe Stamm Helicopter Competition.

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

Canada's Industry and British Designers

I HAVE read with great interest "Technician's" excellent letter (July 11th) in which he disputes Mr. W. E. Petter's implication that British technicians are lacking in duty to the British aircraft industry because they emigrate to Canada and U.S.A., where they get paid what they deserve.

One of the most refreshing aspects of Canadian and American aviation is that a man, of whatever social standing and largely regardless of age, can command both position and salary which his merits deserve. Where a man may take 25 years in England to reach the status and pay his contribution deserves, he may take five years or so in the New World.

As Canada's great future unfolds, so the Old Country will lose her sons to a land where standards are higher and fresh air blows through industry. We are a Commonwealth in which we are free to circulate (though we must leave our Sterling behind). It is not reasonable to speak of the great Brotherhood of the Commonwealth in one warm breath and then coldly blame an Englishman who prefers the company of a brother in Canada to remaining tied to the mother country.

Britain became great because her people set out for other shores and a better, freer life. Those emigrants largely remained affectionately loyal to the mother country. But if the mother country treated her emigrants as sons lacking in duty then our Commonwealth would not be what it is today.

Are we to assume that Mr. Petter considers Rolls-Royce, de Havilland, Avro, and others are lacking in duty by establishing subsidiaries in Canada? May not the technician emulate the employer? On the contrary, if sufficient technicians emigrated to Canada the British aircraft industry would follow.

I forecast that the S.B.A.C. Show, 1960, will be held at Toronto Airport!

I have travelled about the world much during the last ten years and seen U.S.A. and Canada in relation to other lands. Many Englishmen are ignorant of what awaits them in the New World. If the Commonwealth is to survive, 10,000,000 Englishmen should emigrate during the next ten years to Australia, New Zealand, and to Canada (yes, and to the United States). It is our duty to the Commonwealth to do so.

Godalming, Surrey. ROBERT BICKNELL.

[No doubt the following further letter from Mr. Petter will help to put this matter into perspective.—ED.]

I AM afraid that your correspondent "Technician" in his letter published in your issue dated July 11th, has entirely missed the point of my previous letter, which was not that the acceptance of a more highly paid post in Canada was selfishness on the part of the individual, but a plea that the young aircraft engineer, in considering his future career, should give due and profound thought to the sense of achievement and satisfaction which he derives from his work in addition to immediate emoluments. Mistakes can so easily be made in this matter through inexperience, with consequent disillusionment at a later date.

In the liberal professions instanced by your correspondent, there are, of course, very wide variations in the level of earnings due to the individual's skill and standing in the community. In aircraft technology, where there are many more grades or classifications, there are bound to be similar and even greater variations.

The more enlightened aircraft firms in this country certainly appreciate the importance of a balanced scale of salaries covering the whole of the variations in degree of responsibility, experience, etc., whether it be on design, technical, research work or on the productive and administrative sides. The relatively high average earnings of the aircraft production worker ensure that this must be so and, indeed, the maintenance of such properly graduated scales is one of the most important functions of management.

In the aircraft-design field the normal play of economic forces should rapidly correct the lot of any underpaid technicians in this country, and the converse is equally true: that a considerable influx of technicians into Canada, etc., will eventually create a surplus and result in a lower scale of remuneration.

Under present world conditions actual emoluments in aviation at all levels in both Canada and the U.S.A. are considerably higher than in this country; even so, it is gratifying to find that some of the aircraft technicians who emigrated to Canada have now returned to this country to take up more interesting work, even at some material loss to themselves.

W. E. W. PETTER,

Hamble, Hants. Managing Director, Folland Aircraft, Ltd.

Dark Contrail?

AN unusual sky trail was seen over Cambridge on the morning of July 14th, between 9.15 and 9.30 a.m. The phenomena passed over the north side of the city in a line from north-east to south-west, at an estimated height of between three and four thousand feet.

The trail, which was extremely dark at its base, had a vee-shaped appearance when seen in section and was several hundreds of feet in length. There was a certain amount of medium cloud above it and, behind, the sky was extremely clear.

One observer to whom the writer spoke described it as having a "butterfly-tail" form and said that along the base there was a thick, black roll cloud, resembling the more familiar line-squall formation. There was, however, no line-squall activity in the area during the morning in question. Cu-nim clouds were, however, in evidence.

Many people have noticed that Sabres and Shooting Stars leave black trails, particularly when flying at the lower altitudes. Is it possible that one such machine flew out of the medium cloud during aerobatics, left the trail and then flew away again before being seen?

Cambridge. G. N. N.

"THE SOUND BARRIER": A MAGNIFICENT FILM

DURING this week, cinema-goers to the Plaza, London, have seen the first run of a really great film—probably the greatest flying film ever made. We voice this opinion, moreover, after having seen most of, if not all, the principal aviation pictures of the last 25 years. Written by Terence Rattigan, produced and directed by David Lean, with Sir Ralph Richardson, Ann Todd, Nigel Patrick, John Justin and Dinah Sheridan leading a cast with not a false or ill-played character in it, *The Sound Barrier** is an outstanding and at times bitterly moving film.

Briefly, it tells of the problem which faced and to some extent still faces the aircraft designer and the pilot in defeating the effects of flight at sonic speed. Inevitably, the test pilot's wife fears for her husband; equally inevitably—filmically—the test pilot is killed. But this is not cheap emotionalism. Test pilots do get killed, some of them, and in this film the whole thing is treated with a simplicity and sincerity which matches the greatness of the work. Sir Ralph Richardson gives a memorable performance as the aircraft manufacturer, and Joseph Tomelty (whom we have never seen before) is not overshadowed by this in his playing of the chief designer. Ann Todd does a better job than we have ever seen her do before, and Nigel Patrick and John Justin, as the pilots, give an authenticity to parts which, so easily, could have been spoiled by less skilful handling. To the director the credit of welding story and players into something not easily to be forgotten. The "other stars" of the picture are the aircraft—Vampire, Attacker and Swift—and, of course, the firms' test pilots who do the actual flying. If models were used for any of the "air" shots then we failed to notice it—and that itself is a measure of the film's quality.

There are, of course, points at which the aviation pedant will cavil; liberties have, for example, been taken with time so that events are shown coincidentally which, in fact, were months apart. But this is a small price to pay for a picture which in theme, feeling and fidelity to the nature of things is so absolutely, so compellingly right. Never before have we seen the sheer beauty of flight so clearly portrayed: it is, after all, largely a matter of feeling—fundamentally it is an emotional experience—yet in a few brief scenes, by the most masterly air-to-air photography, that indefinable nuance of the illimitable is made real, and the earth-bound man and woman in their cinema seats may glimpse for a fleeting moment a little of that wondrous, joyful loneliness of those who are privileged to move in the emptiness of the upper air.

**Presented by London Films, and distributed by British Lion Film Corporation.*

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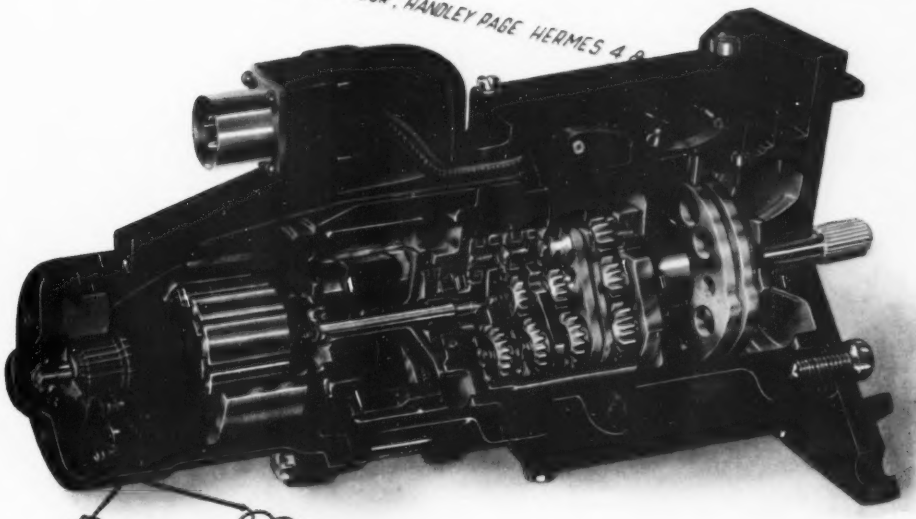

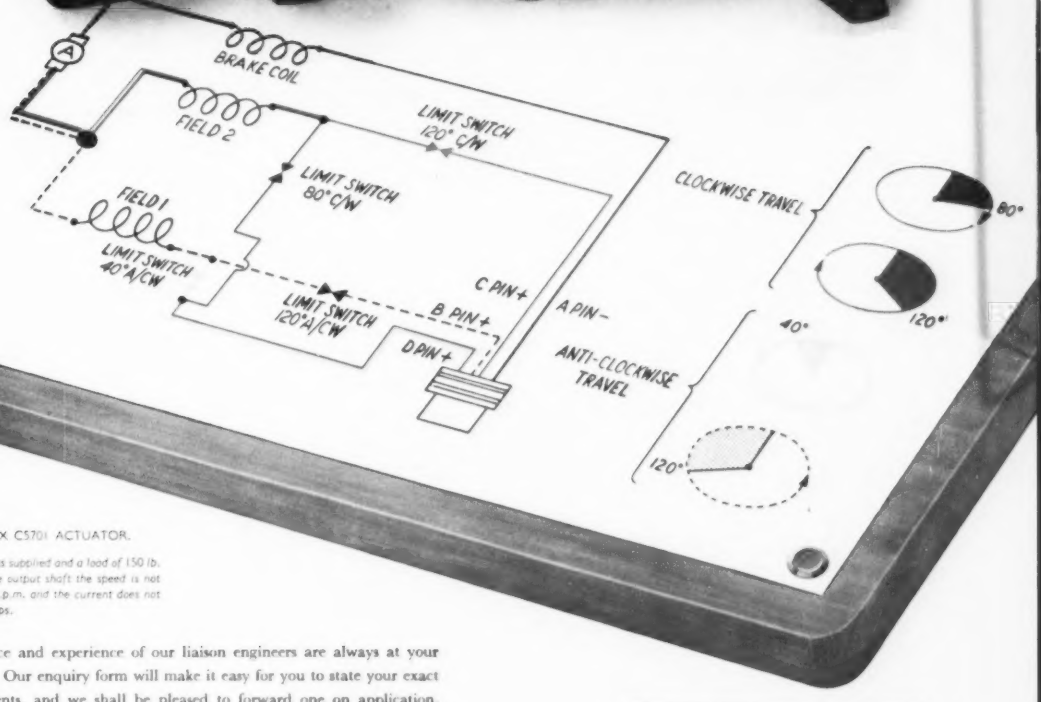

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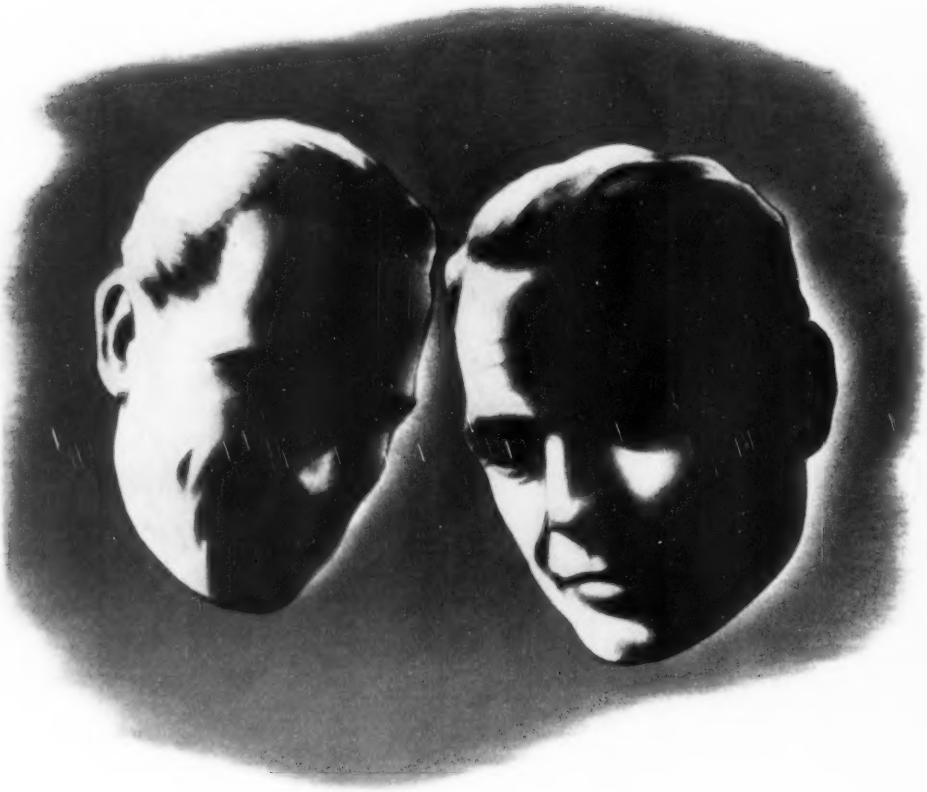

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CIVIL AVIATION

COMETS FOR JAPAN—

A TOKYO report that Japan Air Lines have ordered two Series II Comets was confirmed last week-end by de Havillands, who add that Japanese orders have also been placed for three Herons and four Doves. Together, the contracts represent some £1½ million in the U.K. export drive.

J.A.L., who have led the Japanese civil-aviation revival, at present link the main islands by services operated with Martin 2-0-2s and DC-4s. The Avon-Comets are intended for the first external services, which the company hope to extend westward to India and eastward across the Pacific. The same operators have ordered the Herons for new feederline routes to supplement the existing inter-island services.

Three of the four Doves are understood to be for a new concern which is to organize local services radiating from the industrial city of Nagoya, while the fourth is to be used for executive and publicity work by a powerful Japanese newspaper. The de Havilland agency in Japan is held by Cornes and Co., Ltd., of Tokyo.

Japan—whose peace treaty with the Allied Powers was signed only three months ago—is said already to have a large sterling balance, accumulated with the aid of her export revival.

Another recent report from the Japanese capital says that Osaka Chosen Kaisha shipping line is forming a subsidiary named Japan International World Airways, to open a passenger-cargo service to the U.S.A. and South America on October 1st. Initially, American crews and aircraft are likely to be employed, and Eastern Airways are said to have tentatively earmarked four DC-4s for the service; this company has an option to buy a 25 per cent interest in J.I.W.A. Proposed schedules are given as two weekly return flights between Tokyo and San Francisco, and one return flight between San Francisco and Sao Paulo, Brazil.

—AND TO CEYLON

PLANS to introduce the Series I Comet into regular service between London and Colombo, Ceylon, were announced by B.O.A.C. last week. From August 11th, the service will operate once weekly in each direction through Rome, Beirut, Bahrain, Karachi and Bombay. Actual flying time for the 5,940-mile journey will be 16 hr 35 min, compared with 29 hr 35 min for the existing Argonaut service *via* Frankfurt, Rome, Cairo, Bahrain and Karachi. Total journey-time for the Comet will be 21 hr 35 min (the Argonauts take 33 hr 45 min).

The Ceylon service follows successful experience with B.O.A.C.'s thrice-weekly services by Comets in both directions between London and Johannesburg. The Corporation also plans to inaugurate regular Comet services to Singapore in the autumn and to Tokyo early in 1953.

C.A.T. WINS APPEAL

LAST Monday, the Judicial Committee of the Privy Council allowed the appeal of Civil Air Tran-port Inc., of Delaware, against the dismissal in the Hongkong Supreme Court of their claim that 40 civil aircraft, valued at over £1 million and grounded at Kai Tak airfield, Hongkong, were their property.

Lord Oaksey ruled that judgment should be entered that the 40 aircraft were the property of the appellants. There would be no order as to costs. He said that their lordships would give their reasons at a later date.

The case hinged on whether the recognition at midnight on January 5th-6th, 1950, of the Central People's Government as the *de jure* Government of China could affect a contract of Dec. 12th, 1949, for the sale of aircraft by the Nationalist Government to an American partnership, predecessors-in-title of the appellants.

The machines, which were operated by the Chinese Central Air Transport Corporation, were flown to Hongkong in the summer of 1949 on the orders of the Nationalist Government, then recognised by the British Government. After they had been sold to the American concern, Britain recognised the Communists, and the Supreme Court of Hongkong held that the aircraft were now their property.

SOUTH BANK ROTOR STATION?

TWO weeks of tests began last Monday, July 28th, when a Sikorsky S.51 of the B.E.A. Helicopter Unit was flown into the South Bank site at Waterloo. The object is to ascertain the suitability of the site to become a main rotor station for Central London. The S.51 approached along the Thames after flying from Gatwick *via* Barnes Common and Hurlingham. On Wednesday the Unit's Bristol 171 was due to follow suit, and both machines will, during the fortnight, fly over the Houses of Parliament at a height of 500ft so that noise measurements can be made in the chambers of both Houses.

This series of test flights marks the latest stage in the preparations for regular helicopter services which began in 1947 and will, it is hoped, culminate in regular passenger services with 12-seat twin-engined helicopters in about two years' time.

"Flight" photograph

SIKORSKY AT WATERLOO: W/C. R. A. C. Brie, who has piloted rotating-wing aircraft for more than 20 years and is now in charge of the B.O.A.C. Helicopter Unit, flew as an observer to the South Bank Site (see below). The pilots for the tests are Capts. J. G. Theilmann and J. A. Cameron.

INTEREST IN THE BRITANNIA

RECENT criticisms of B.O.A.C.'s policy in ordering Bristol 175 Britannia turboprop-powered transports are not supported by re-equipment trends in America, where backlogs for "stretched" versions of the DC-6 and Constellation are growing almost daily. Present indications are that the Britannia will be superior on all counts to its rejuvenated American competitors. B.O.A.C. are confident that it will prove one of the most economical transport aircraft ever built, and some of the larger independent British operators make no secret of their high opinion of the Britannia as a vehicle for long-haul trooping, tourist and freight services. PanAm president Juan Trippe was reported to have been very impressed when he saw the 175 prototype at Filton recently, and published performance-estimates for the aircraft will not have passed unnoticed by other American airline executives. One potential customer might be Bob Prescott, president of the non-scheduled Flying Tiger freight company, who (according to *Aviation Week*) "looks for airfreight really to come into its own when efficiently operating turboprop planes are available. He wants one in the vicinity of 150,000 lb gross with a 50,000 lb payload and enough range for transatlantic non-stop with that load. . . ."

AER LINGUS PROSPERS

AER LINGUS reports a record profit of £92,180 in the financial year ended March 31st, 1952 (last year the profit was £14,646). Gross revenue rose by £317,618 to £1,619,670; but operating expenses also increased by £243,946. Revenue derived from passenger traffic formed the bulk of the company's earnings. Over 269,000 passengers paid £1,342,851 in fares—an increase of £208,080 over the 1950-51 figure. The average passenger load factor was 74 per cent.

Earnings from cargo traffic (nearly 4,000 tons—an increase of 33 per cent.) were £131,335. Aer Lingus carried 1,410 tons of mail (six times last year's total) which added £77,133 to the company's income. A 96 per cent. degree of regularity was maintained on the mail service.

In view of the expected continued increase in the Aer Lingus cargo and passenger traffic, the company placed in 1951 orders totalling £1,558,000 for the purchase of eight new aircraft—four Vickers-Armstrongs Viscounts and four Bristol Wayfarers.

Aer Rianta, which administers Dublin Airport, also had its most successful year, making an airport-management profit of £19,595, as against £3,884 last year. Although aircraft movements showed a slight decrease over last year's total, the number of passengers passing through the airport increased from 235,905 in 1950-51 to 279,618 this year.

CIVIL AVIATION . . .

THE NEW A.T.A.C.

IN reply to a question by A. Cdre. A. Harvey (Con., Macclesfield) in the House of Commons on July 24th, Mr. A. Lennox-Boyd, the Minister of Civil Aviation, announced that the reconstituted Air Transport Advisory Council would consist of Lord Terrington (chairman), Viscount Runciman, Sir John Ure Primrose, Mr. Gerard D'Erlanger and Mr. J. J. Taylor.

A. Cdre. Harvey congratulated the Minister of Civil Aviation on obtaining the services of such highly-qualified gentlemen for this very important task, but his feelings were evidently not shared by Mr. Frank Beswick (Lab., Uxbridge) who asked the Minister if he did not really think the usefulness of the Council had come to an end, and that it would be better if he [the Minister] took full and sole responsibility for the damage he was about to do. Mr. Lennox-Boyd replied that all the Council members approached their tasks with the utmost optimism.

The A.T.A.C., set up in 1947 by Order in Council in accordance with the Civil Aviation Act (1946), is responsible for considering any representation made to it by the public concerning the adequacy of the facilities provided by the Corporations, or concerning charges made for such facilities, and to consider questions referred by the Minister of Civil Aviation. The Council has not the executive powers of a tribunal, but makes recommendations to the Minister, who then decides what action shall be taken.

The chairman, who is appointed by the Lord Chancellor, must be a barrister, advocate or solicitor of not less than seven years' standing. Members who are appointed by the Minister must not be less than two nor more than four in number. Of the members, at least one must be experienced in the operation of air-transport services and at least one experienced in the operation of the other transport services. No member or employee of the Corporation can be a member.

The primary task of A.T.A.C. is to consider applications from independent operators wishing to fly scheduled services under Associate Agreements (the technical contracts enabling private companies to take part in activities originally reserved by Act of Parliament for the State-owned Corporations). Now that increased opportunities have been promised to the independents, the importance of this aspect of the Council's work will increase proportionately. When he first announced the new policy, Mr. Lennox-Boyd indicated that he would prefer the A.T.A.C. to be given statutory licensing powers comparable with those of the American Civil Aeronautics Board. To confer such powers, however, would have involved a change in legislation—which the Government were not prepared to attempt, for the present at least. The uncompromising attitude of the Opposition towards the new policy seems to have persuaded the Minister to "play down" the idea of forming a British C.A.B.-equivalent; indeed, more recently he has tended to stress the fact that A.T.A.C. is still an advisory body, and that the final right to authorize new scheduled services by private companies will remain in Government hands.

There follow notes on the careers of the members of the Council :—

LORD TERRINGTON, K.B.E., is aged 64, was educated at Winchester and New College, Oxford, and was called to the Bar in 1911. He was a Principal Assistant Secretary of the Ministry of Labour and National Service from 1941 to 1944, and has been a member of the National Arbitration Tribunal (now the Industrial Disputes Tribunal) since 1944, becoming chairman of the Industrial Court in 1946. On the setting-up of the A.T.A.C. in June, 1947, he was appointed chairman. Since 1949, he has been Deputy Speaker and Deputy Chairman of Committees, House of Lords.

VISCOUNT RUNCIMAN, O.B.E., A.F.C., is 52 and was educated at Eton and Trinity College, Cambridge. A director of Walter Runciman and Co., Ltd., and other shipping companies, he is also president of the Institute of Naval Architects and this year became president of the Chamber of Shipping. He was director-general of B.O.A.C. from 1940 to 1943.

SIR JOHN URE PRIMROSE, D.L., J.P., is 52; he was educated at Kelvinside Academy, Glasgow, and Stanley House, Bridge of Allan, Perthshire, and has served in the Navy (1914-18) and the Army (1939-45). He is a director of several companies, and a member of both the Aerodrome Owners' Association of Great Britain (as chairman from 1939-43) and the Scottish Advisory Council for Civil Aviation. He has been a member of the A.T.A.C. since its inception in June, 1947.

GERARD JOHN REGIS D'ERLANGER, C.B.E., is 46 and was educated at Eton. He is a director of several companies and is well known in aviation circles as a director of British Airways from 1935-40, the war-time commander of the Air Transport Auxiliary, 1939-45, as a member of the B.O.A.C. board from 1940-46 and as B.E.A. chairman from 1947-49.

JOSEPH JOHN TAYLOR, O.B.E., who is 56, has been secretary and general manager of the Workers' Travel Association since 1948. He is the hon. treasurer of the A.R.B. and was a member of the Courtney Committee on the Tudor.

QANTAS APPOINTMENT

A VETERAN pilot of Qantas Empire Airways, Capt. L. R. Ambrose, has been appointed the company's manager in London. After learning to fly in 1927 and spending several years with the R.A.A.F., Capt. Ambrose joined Qantas in 1935 as a first officer, attaining command in 1937. Probably the most important of the many special flying assignments he received during the war was that of taking part in the historic Ceylon-Perth flights (3,500 miles non-stop) by which Qantas Catalinas restored the Commonwealth air-link during the war. Together with Capts. Tapp and Crowther, he received the Johnston Memorial Navigation Trophy for this work. Other war-time tasks performed by Capt. Ambrose included the ferrying of Catalinas from the U.S.A. to Australia for the R.A.A.F.; the establishment of Tjilatjap, in Southern Java, as a flying-boat base after the fall of Malaya; and taking troops into New Guinea by flying-boat during the Australian advance there.

After the war, as the company's senior pilot, Capt. Ambrose supervised the training of new pilots, opened a twice-weekly Lancastrian flight between Australia and Japan and, in 1949, made the first Sydney-Johannesburg flight by a direct crossing of the Indian Ocean. As recounted in *Flight* of July 18th, the result of this pioneering survey will be the inauguration, next September, of a regular Constellation service along the same route, with the same stopping points—Perth, the Cocos and Mauritius (the Constellation proving flight for this service made its departure from Sydney on schedule last Friday, under the command of Capt. K. G. Jackson). For the past three years, Capt. Ambrose has been Qantas manager in Singapore.

NEW AFRICAN AIRFIELD

PILOTED by W.C. A. N. Francombe, D.S.O., deputy general manager of East African Airways Corporation, a Dakota recently landed on the new runway at Mtwara, Tanganyika. W.C. Francombe satisfied himself that the runway, 4,000ft long and 100ft wide, is suitable for the opening, in the near future, of a bi-weekly Dakota service from Nairobi.

At present there are no buildings at the airfield, but construction by the public works department is about to begin under the supervision of the provincial engineer, Southern Province.

BREVITIES

REPRESENTATIVES of Folkestone Town Council visited the M.C.A. last week to discuss the possibility of buying Lympne Airport, offered for sale by the Ministry many months ago.

* * *

Douglas Aircraft Corporation has decided to move its European H.Q. from Brussels to Geneva early in September.

* * *

Net profit of American Airlines in the first half of 1952 was $5.1m (about £1.8m), compared with $5.78m during the same period last year.

* * *

Mr. A. E. Robinson, B.E.M., has joined East African Airways as engineering manager; from 1948 until recently he was with Aden Airways as chief engineer.

* * *

The annual conference of the Aerodrome Owners' Association will this year be based in London; members are advised to note the dates—September 24th and 25th—and to make early reservations for accommodation.

* * *

Following the resignation, last week, of Mr. John Tyzack, B.E.A.'s director of administration services, Mr. Peter Masefield (chief executive) said that no successor would be appointed: development of the organization made the post no longer necessary.

* * *

C.A.B. authority was recently given to Seaboard and Western Airlines to operate 72 monthly long-range flights, additional to its present operations, and not 12 as originally reported. Seaboard, who operate nine DC-4s on a non-scheduled basis, have permission to carry 40 per cent freight on the outward legs of these trips, and 100 per cent on return to the U.S.

* * *

Freighters of Silver City Airways flew both the French and Egyptian Olympic horse teams from Paris to Helsinki. Other military loads carried by S.C.A. included the bands of the Queen's Own Hussars and the Royal Marines, both recently flown to France with their instruments. Most of the other charter flights made by the company lately have carried pigeons or racehorses.

The General Council of the Trades Union Congress has announced its opposition to the new civil aviation policy of the Government.

* * *

During 1951, deaths from accidents to scheduled American airliners totalled 206 (including 33 crew-members), compared with 144 passengers and 21 crew in 1950. The index of passenger-deaths per 100 million passenger-miles was 1.3 in both years.

* * *

De Havilland Herons will be used by New Zealand National Airways for services from Rongotai to Blenheim and Nelson, and on the Dunedin-Invercargill and Christchurch-Timaru-Oamaru routes.

* * *

K.L.M. report that their traffic figures for the first quarter of 1952 show good progress in relation to the same period last year. The number of passengers carried was 98,750, compared with 90,974 in the first quarter of 1951—an increase of 8.5 per cent. The amounts of freight and mail have increased by 17 per cent and 46.3 per cent respectively. The ton-kilometre figure rose by 13.5 per cent and there was a 12.9 per cent increase in sales.

The B.O.A.C. Stratocruiser fleet of ten aircraft has made over 3,120 crossings of the North Atlantic since the first of the aircraft entered service on the London-Montreal-New York route in December, 1949. During the six summer months of 1951 the average daily utilization of the ten Stratocruisers was 7 hr 32 min; equally intensive operation was expected this year, but the fuel shortage curtailed flying. Nevertheless, utilization during the first six months of 1952 was 6 hr 55 min per aircraft.

* * *

Lockheed's backlog for commercial versions of the Super-Constellation reaches 90 with a new order for two 59-seat luxury models—to be delivered in 1954—for Linea Aeropostal Venezolana.

* * *

The Navigators and Engineer Officers Union has issued a statement in connection with B.O.A.C. dismissals following the "Hermes" inquiry. The statement points out that "neither of the two officers involved were members of the Union or qualified to be members." It adds that the navigational arrangements on the aircraft were "in accordance with the present policy of B.O.A.C., which is to place responsibility for navigation on pilots and not on specialist navigators."

ST. MERRYN'S AIR DAY

THE weather was just kind enough to allow a successful air day to be held on June 19th at R.N. Air Station, St. Merryn, Cornwall (Capt. A. S. Webb, R.N.), with flying and static displays of the station's usual high standard.

Flying opened with a stream take-off by 12 Fireflies and six Barracudas, followed by rocket-assisted take-offs by four Mk 6 Fireflies of 820 Squadron and a Barracuda. Both squadrons flew past, with 796, led by Lt-Cdr. Barnes, in an unmistakable anchor formation. Later they attacked a midget submarine on the airfield.

Lt-Cdr. Lygo and F/L. Pinnington, in two Hornets from Culdrose, brought a gasp from the crowd as they passed each other on the narrow runway after taking off from opposite ends; and another Culdrose contribution was a polished demonstration of formation aerobatics by three Meteors led by Lt-Cdr. Perrett.

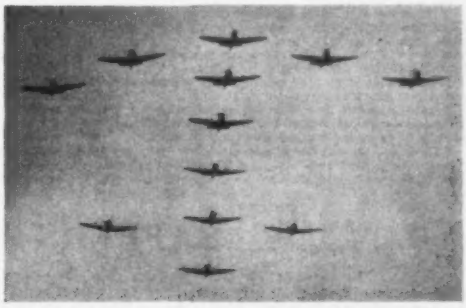
Lt. Knight from Gosport, after giving a display in South Wales earlier in the afternoon, arrived in time to demonstrate the air-sea rescue function of a helicopter by rescuing a pilot from his dinghy; he then put on a small ballet in front of the crowd.

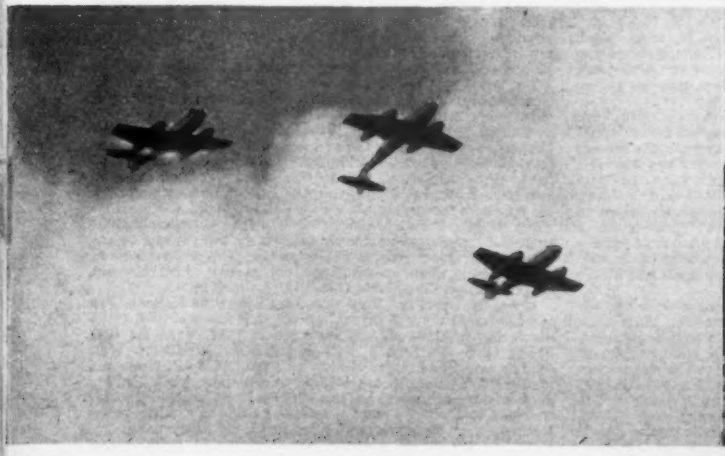
The next item was a type fly-past of naval aircraft, and even the controllers in the tower were surprised to see an extra machine which joined the stream; it was towing a banner advertising Culdrose's air day!

Finally, after the Fireflies and Barracudas had finished their carrier drill and stream landing, an opportunity was given for budding aviators among the visitors to make, over the radio, requests for aerobatics by the pilot of a Chipmunk from Exeter's Reserve Flying School.

Both before and after the flying display, a Gemini, a Messenger and an Auster of the Plymouth Aero Club and a Proctor from Exeter provided joy rides for the public as a counter-attraction to the wide range of excellently-laid-out static displays, which included both technical and non-technical subjects.

A good demonstration of drill was given by the W.R.N.S., and the Fire Station's "Emett" fire engine was a popular attraction.





(Right) Appropriate: An anchor formation by Fireflies of No. 796 Squadron. (Below, left) Lt-Cdr. Perrett's Meteor in aerobatic action; note the shock precipitation from the starboard aircraft. (Below, right) Capt. A. S. Webb and Capt. A. C. G. Ermen, respectively present and past Commanding Officers of H.M.S. "Vulture" (R.N. Air Station, St. Merryn).

QUICK GET-AWAY: As described below, anti-aircraft missiles have been tested at Aberporth; here, a two-stage weapon leaves the ramp, boosted by eight rocket tubes. If M.o.S. approval is forthcoming, typical missiles may be exhibited at Farnborough in September.

A PEEP AT BRITISH GUIDED MISSILES

THAT the Ministry of Supply guided-missile programme is of vast proportions has long been appreciated, but, in the past, only the barest details of the work could be published. Now, following upon the visit of Mr. Duncan Sandys, Minister of Supply, and Lord De L'Isle and Dudley, V.C., Secretary of State for Air, to the M.o.S. experimental establishment at Aberporth, Cardiganshire, last Saturday, some additional details can be given.

The following statement was made by Mr. Sandys after his visit to Aberporth :—

"There are still many technical difficulties to be overcome. It is clear, however, from the impressive firing trials today that some of the most complex scientific problems have been successfully solved and that we are coming within measurable distance of putting these fantastic new weapons into production.

"For reasons of military security I am not free to state precisely the actual performances which are being achieved. But I can at least say that guided rockets have been developed which can travel at well over 2,000 miles an hour and can rise to heights far greater than any bomber is likely to reach for many years to come.

"These rockets can be steered or, better still, can steer themselves through the air with great accuracy. They are capable of rapidly altering course, as they would have to do to intercept aircraft taking evasive action. In fact, they can twist and turn with four or five times the degree of manœuvrability of a fighter aircraft.

"This remarkable progress is the outcome of the combined work of a great number of people in science and industry. The basic research has been mostly done by the Government's experimental establishments. The results of this research have been made available to selected firms, who have been entrusted with the task of developing specific rocket weapons to fulfil various operational roles.

"Almost every branch of industry is playing its part—aeronautics, engineering, electronics, plastics, chemistry, and explosives. For this development work new laboratories, firing ranges, and other facilities have had to be provided on a considerable scale, and we are now planning the factory capacity which will be required for production. More than a hundred firms are now actively engaged on this many-sided enterprise, which is rapidly assuming the proportions of what I can only describe as a new industry—the guided-rocket industry."

The scope of this entirely new field is thus seen in its true perspective. The list of aircraft manufacturers engaged in the work is impressive; it has been officially disclosed that Bristol, English Electric, Fairey, the Propellor Division of de Havilland, and certain members of the Hawker Siddeley Group are all involved in the production of missile "airframes" and power plants; and, no doubt, equally important electronic and instrument firms are also engaged in the production of controlling devices and ground installations.

Aberporth has been a missile-testing station for many years; it overlooks Cardigan Bay, a large area of sea almost devoid of shipping, and has proved invaluable in enabling the guided-missile programme to come to the productive stage at this early date. But space and weather considerations have long made it evident that an improved range was required, and the final choice fell, in 1947, upon Woomera, in central Australia. This very large expanse of desert has since been converted into a well-equipped range with automatic monitoring posts extending for hundreds of miles along the experimental track. [An illustrated article on Woomera appeared in *Flight* of April 13th, 1951.]

It would be premature to attempt to assess, at this stage, the value of the missile programme, or even to comment upon the types of weapon of which photographs have been released; but although many difficult problems undoubtedly remain to be overcome, the progress made in perfecting guided and/or homing missiles as a defence against bombers would appear to give cause for satisfaction.

SAPPERS IN THE AIR

ALTHOUGH, through no fault of their own, the Royal Engineers Flying Club were deprived of two or three hoped-for items at their third annual air day, they and their guests were at least blessed with garden-party weather at Rochester's pleasantly situated little airport last Saturday.

Seven Fireflies of No. 1840 Sqn., R.N.V.R., from Ford, opened the proceedings with a "carrier fly-off" and vanished into the distance, to reappear some minutes later, out of the sun, in a most emotioning attack on the enclosures; then, after one or two passes, they departed for the Sheerness Navy Day.

Rochester is the home of No. 24 R.F.S., and four of their pilots, F/L.s Frith, Singleton, Stroud and Podmore, air-drilled Chipmunks in impeccable formations, bumpy air notwithstanding; later F/L. Podmore went through a lengthy solo aerobatic *repertoire*. Another solo aerobatic contribution was by Rex Bennett, the Royal Engineers' C.F.I., in the Club's Tiger Moth, and then the hoary old instructor-and-pupil act (F/L.s Podmore and G. H. Stroud, in Tigers) was given a new twist when "pupil" Podmore did a monumental overshoot, leapt a hedge, and vanished from sight—quite alarmingly to those unacquainted with the proximity of a deep valley, from which the Tiger safely popped up again half a mile farther round the perimeter.

Parachutist John Ralling, allowing for a little more wind than existed at the moment, landed with a resounding clang on a corrugated-iron roof, then stood on it to welcome the ambulance *and fire-tender* which tore helpfully towards him. Next, two guns of the Field Training Wing, R.A., Woolwich, conducted a shoot under the direction of an Auster (Capt. Clift, No. 661 Air O.P. Sqn.), the effects being timed so convincingly that it was hard to believe live ammunition was not being used; a Meteor 7 (F/L. James) arrived from C.F.S. and gave an aerobatic display typical of that efficient academy; and D. C. Armstrong provided contrast by floating round at odd angles in the Zaunkoenig ultra-light.

But top marks for the afternoon's performances should, perhaps, go to the gliding exponents, who took full advantage of the strong thermals and hill-lift prevailing. From an aero-tow launch, an Olympia of the Army Gliding Club (Lt. Stuart Morrison) performed some fine aerobatics, the tight loops and turns of which a sailplane is capable adding to the effect; an adroit contribution in a Tandem Tutor emphasized the efficiency of the R. E. Gliding Club's instruction, for the pilot, Lt. Smith, was said to have done only seven hours; and some startling-looking aerobatics were performed by F/L. Piggott (from the R.A.F. Gliding School, Detling), perched out on the precarious-looking seat of an open-fuselage primary trainer. He gave his exhibition after being towed draughtily round the sky behind an Auster, and, having torn himself off a lengthy strip of Mk 3 Bronco, he even performed the classic paper-cutting act.

For the rest, B.B.C. commentator Franklin Engelmann, himself an ex-R.E. officer, gave a commentary which, but for one or two technical infelicities, was as professional as was to be expected; and the visiting pilots' arrival competition was won by Mr. Holland, in a Panshanger Chipmunk. G-AJVD.

It was the Royal Engineers who, long before the Kaiser's War, laid the foundations of British military aviation, and their traditional link with the air was re-forged in 1934, when the R.E. Flying Club was formed, with branches at Brooklands, West Malling and Cambridge. Today, as guests of Short Bros. and Harland, Ltd., they operate at Rochester Airport, while a strong gliding side—enhanced by the experience of many members stationed in Germany since the war—is based at R.A.F. Station Detling. Club aircraft wear R.E. colours in a fuselage band.

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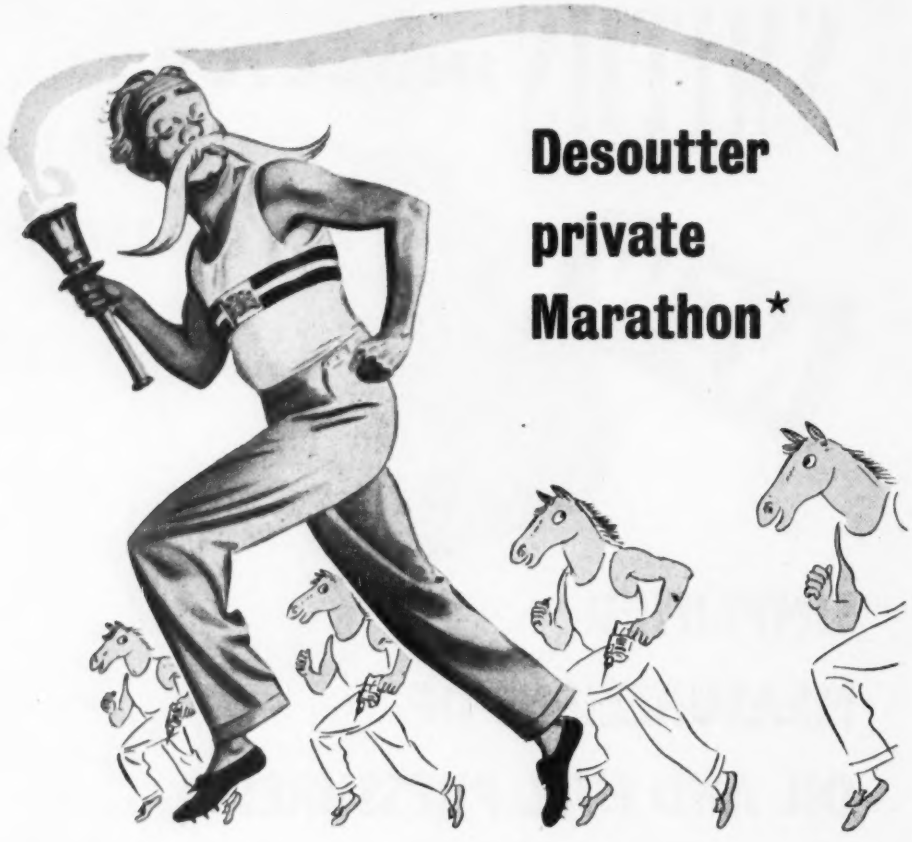

Desoutter private Marathon*

Although debarred from competing under the International Shamateur Ruling, I have decided to take a team of my Little Horses to the Olympic Games. We shall *all* run non-stop from Le Havre to Helsinki and carry on continuously round the outside of the Stadium during the whole period of the Games. We shall thus prove once again that when it comes to power, speed, quickness off the mark and coolness in the heat of the moment, Man has nothing on my Little Horses except his shirt. We sail for Finland with quiet confidence and an abundance of sporting spirit which I have seen fit to lock up in my cabin.

★ *Letters explaining that this is* not *a Marathon or telling us what a Marathon is will remain unanswered and indeed unopened.*

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SERVICE AVIATION

The Queen Presents Her Colour to Halton

ON Friday of last week No. 1 School of Technical Training received the Queen's Colour from Her Majesty's hands.

A blazing sun was already beating down on the parade ground at 1130 hour, when the "still" was sounded, and the Royal Standard broken to mark the Queen's arrival.

She was received by Lord Cottesloe, Lord Lieutenant of Buckinghamshire, Marshal of the Royal Air Force Sir John Slessor, Marshal of the Royal Air Force Lord Trenchard, Air Marshal Sir Victor Groom (who has recently returned from the Middle East to become A.O.C.in-C. Technical Training Command), A.V-M. R. O. Jones (A.O.C. No. 24 Group, of which Group Halton forms a part) and the Commandant of Halton, A. Cdre. J. G. W. Weston. There were some 1,700 apprentices on parade.

The Colour to be presented lay cased against the piled drums in front of the royal dais as the parade commander, G/C. D. O. Finlay, reported the Escort Squadron and the main parade as ready for inspection. Her Majesty then stepped into a special Land-Rover to be driven slowly along the ranks; meanwhile the band played the two traditional slow marches of the R.A.F., *Green Sleeves* and the *Skye Boat Song*.

On the return from the inspection the two Queen's orderlies uncased the Colour and placed it, draped, upon the piled drums, waiting the request of the Commandant (A. Cdre. Weston) to the Chaplain-in-Chief to consecrate it. With the parade called to attention, the Rev. Canon L. Wright said, "We are gathered here to consecrate this Colour, the solemn symbol of our loyalty, and with it ourselves, our service and our life. May this Colour never be unfurled save in the cause of justice, righteousness and truth."

At the conclusion of the dedication service, the Queen received the Colour from A. Cdre Weston and made the presentation, Sgt. App. F. M. A. Hines being appointed Colour Bearer to receive it.

With the parade standing at ease, Her Majesty then addressed the assembly. She said: "A. Cdre Weston, officers, staff and apprentices of No. 1 School of Technical Training, I am very glad to be here to present your new Colour.

"As you know, your school was founded in the reign of King George, my grandfather, and it owes its existence to the foresight and inspiration of Lord Trenchard, who is here with us today.

"It was clear then, as it still is, that the Royal Air Force must be able to place the same reliance on the technical skill of its tradesmen as on the gallantry of its pilots and the experience and imagination of its commanders. Halton was the first school to be started for this purpose, and today it gives you not only technical skill, but a spirit which is acclaimed wherever the Royal Air Force serves in defence of our country and our Commonwealth.

"It is right, therefore, that Halton should be the first apprentice school to earn the award of a Colour and I am sure that you will always remember this occasion—as I shall—as a great day for yourselves and your service.

"Your traditions have been well and firmly established by those who have gone before you. For they have made their mark and have justified the confidence which the Royal Air Force, has always placed in them, while many of their number have given their lives in carrying out their duties. From what I have seen on this parade, I am sure that you will be very worthy successors to their example of honour, service and sacrifice.

"I congratulate you on your drill and on the smartness of your turnout, which are proof of your keenness and your quality, and I give you your Colour in the knowledge that while you are here you will guard it well.

"Let it also be a reminder to you of the trust that I place in the Royal Air Force. During your future service you will, I know, strive to the utmost to be worthy of that trust and to maintain the unsullied standards of which this Colour is a symbol."

The Commandant thanked Her Majesty and the general salute was given to the Colour as it was marched in slow time to its position.

Upon the return of the Queen to the dais the Escort Squadron, composed of the 63rd Entry to Halton, marched past in both slow and quick time. Finally, the whole parade advanced in review order to give a royal salute and three cheers for Her Majesty before marching off.

The Queen took lunch in Halton House, which is now the officers' mess but was, at one time, a private residence of the Rothschild family, where the Queen's great grandfather, King Edward VII, then the Prince of Wales, was a frequent visitor. Some of the rooms are entirely decorated in gold leaf. After lunch a tour was made of the camp before the royal entourage left for Windsor.

A.V-M. David Atcherley

MEMORIAL services for the late David Atcherley were held last week in the Canal Zone (July 17th) and at St. Margaret's, Westminster (July 23rd).

Representatives of the Air Council were present at St. Margaret's, together with many of the A.O.C-in-C.s of the Commands. Canon Charles Smyth officiated, assisted by Canon L. Wright, Chaplain-in-Chief, R.A.F.

At St. George's Church in Moascar, in the Canal Zone, the Rev. C. B. Verity officiated and the lesson was read by Air Chief Marshal Sir Arthur P. M. Sanders, A.O.C-in-C., M.E.A.F.

At both services the churches were filled to capacity and A.V-M. R. L. R. Atcherley, David's brother, was present on both occasions.

(Below) Her Majesty passing down the lines of apprentices before the colour presentation. (Left) Having received the dedicated Colour from A. Cdre. Weston, the Queen makes the presentation.

SERVICE AVIATION . . .

S. of S. to Visit Canal Zone

IT is expected that the Secretary of State for Air, Lord De L'Isle and Dudley, V.C. will leave West Malling on August 10th to visit stations in the Middle East.

He will fly in a Transport Command aircraft and has planned to return to Britain on August 28th.

New Carrier for R.C.N.

ARRANGEMENTS have been completed for the purchase by Canada of an aircraft carrier from Britain to replace H.M.C.S. *Magnificent*, now on loan to Canada from the Royal Navy.

The new ship is one of the *Majestic* class of light fleet carriers laid down at the end of the war, but on which the construction work was suspended.

Revised plans provide for a completely modern carrier capable of handling jet and heavy aircraft types. Modifications will include strengthening of flight deck and elevators and improvements in deck arrester gear. The new British steam catapult will also be fitted. This catapult has proved itself capable of launching jet fighters from an aircraft carrier even when it is heading downwind at sea, and also, in certain circumstances, of doing so when the ship is lying in dock.

The new aircraft carrier is being built in the yard of Harland and Wolff, Belfast.

Saclant Changes

FOLLOWING the statement, in April last, that consideration of the names of sub-area commands of Saclant were being made, the following changes are now announced.

The naval sub-area, commanded by Vice-Admiral Sir Maurice Mansergh (Commander-in-Chief, Plymouth), previously announced as North Eastern Atlantic Sub-Area, will in future be known as Central Sub-Area. That commanded by Rear-Admiral J. H. F. Crombie (Flag Officer, Scotland), previously known as the Northern European Sub-Area, will be known as Northern Sub-Area.

The areas of the commands of these Flag Officers which lie within the United Kingdom Home Station Command will be known as Western Approaches and Northern Approaches respectively.

The corresponding air commands have been changed likewise. A.V-M. T. C. Traill (A.O.C. No. 19 Group), previously Air Commander, North East Atlantic, now becomes Air Commander, Central Sub-Area. A.V-M. H. T. Lydford (A.O.C. No. 18 Group), previously Air Commander, North Sea, will in future be known as Air Commander, Northern Sub-Area.

R.A.F. Appointments

AFTER having been A.O.C. and Commandant of the Royal Air Force College Cranwell since July, 1950, A.V-M. L. F. Sinclair, G.C., C.B., C.B.E., D.S.O., is to become Commandant of the School of Land/Air Warfare at Old Sarum, Wiltshire. Command of the College will be taken over by A. Cdre. H. Eeles, C.B.E., who until recently was Assistant to the Deputy Supreme Commander (Air), Allied Powers, Europe, and before that was himself on the directing staff of the School of Land/Air Warfare.

Other appointments recently announced include that of A. Cdre. W. J. M. Akerman, C.B.E., who is to be A.O.A. to F.E.A.F., and of A. Cdre. W. H. Merton, O.B.E., as A.O.C. No. 22 Group, Technical Training Command. Both of these officers will assume the acting rank of Air Vice-Marshal.

No. 63 Group, Home Command, is to have G/C. (acting Air Commodore) G. T. Jarman, D.S.O., D.F.C., as its new A.O.C. He comes from the station command of Middleton St. George and before that commanded C.F.S. at Little Rissington.

To take up his new appointment as Director of Administrative Plans at the Air Ministry, A. Cdre. J. B. M. Wallis, O.B.E., has returned from Ceylon after two years in the East as chairman of the Asian Establishment Committee.

IN KOREA: S/L. W. Bennett, D.F.C., Deputy Commander of No. 77 Squadron, R.A.A.F., checks the target area with W/C. P. Ottewill, G.M., before taking off on a sortie. W/C. Ottewill is on loan from the R.A.F. to command No. 2 Fighter Operational Training Unit in New South Wales.

Searchlights in the House

ASKED by Mr. Ian Harvey in the House of Commons whether he would now dispense with the searchlight as a means of anti-aircraft defence, Mr. A. H. Head, the Secretary of State for War, replied that it was not at present proposed entirely to dispense with them. Trials had shown that they still had a certain part to play in defence against low-altitude attack at night.

Reunion

BIGGIN HILL will be the venue for No. 600 (City of London) Squadron's reunion on August 9th. Those interested are asked to communicate with the unit's town headquarters at Finsbury Barracks, London, E.C.1.

NORTH GREENLAND EXPEDITION

SUNDERLAND flying boats of No. 230 Squadron at Pembroke Dock, South Wales, are playing an important part in the British North Greenland Expedition, which is being led by Cdr. C. J. W. Simpson, R.N., to explore a mountain range in north-east Greenland and the ice-cap lying beyond.

The Sunderlands are carrying the 26 members of the expedition and their 150 tons of stores and equipment from Young Sound, on the east coast of Greenland (74° 29′ north, 20° 40′ west) to the expedition's base-camp site at Britannia Lake (77° 07′ north, 23° 40′ west). This lake, which is some 6,000 yd long and 3,000 yd wide, lies 190 miles from Young Sound and is 888 miles from the North Pole. It has never before been used by flying boats and is normally free of ice for only six weeks in the year.

The first Sunderland, captained by S/L. J. S. Higgins, D.F.C., A.F.C., left on Monday, July 21st, for Reykjavik, with Cdr. Simpson and four members of his party on board, and the main expedition left London on July 8th in the Norwegian sealing ship *Tottan*. From Reykjavik, S/L. Higgins's Sunderland is making such ice-reconnaissance flights as may be necessary to locate a clear passage to Young Sound for the *Tottan*, and F/L. W. T. Morrison will transfer from the first Sunderland to the *Tottan* at Reykjavik and will be responsible for laying moorings for the flying boats at Young Sound, and later at Britannia Lake.

The remaining four Sunderlands, under the command of F/L. C. M. Stavert, were due to leave Pembroke Dock on July 31st or August 1st, when the *Tottan* and the first flying boats have arrived at Young Sound.

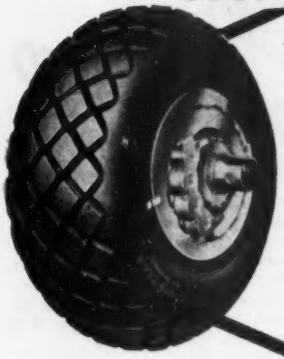
When all the aircraft have reached Young Sound, S/L. Higgins will make a reconnaissance of Britannia Lake, landing if conditions are suitable. The lake has not been surveyed, but, on a previous visit to Greenland, Cdr. Simpson estimated from the size of the icebergs that it was suitable for use by flying-boats. The aircraft will lay its own moorings and an advance party will be put ashore by rubber dinghy. The full airlift will start the following day.

Saunders-Roe pontoons, which are being flown from Pembroke Dock in the first Sunderland, will be used to make landing stages at Young Sound and Britannia Lake. At this stage of the expedition, a Lancaster aircraft from R.A.F. Station, St. Eval, operating from Reykjavik, will drop an airborne lifeboat at Britannia Lake to assist with unloading operations.

The Sunderlands will make four flights a day from Young Sound to Britannia Lake, carrying between 3½ and 4 tons of stores on each trip. The R.A.F. unit will live in tents and their working day will be from 0500 hr until 2200 hr. If the weather is good, the airlift should be completed within 14 days, and the Sunderlands will be back at Pembroke Dock by August 20th. Ice conditions will compel them to leave by the end of August. The R.A.F. unit is entirely self-supporting and 20 servicing personnel have been taken from Pembroke Dock.

FOR GREENLAND: S/L. J. S. Higgins, O.C. No. 230 Squadron, who left for Greenland on July 21st. With him is F/L. Stavert.

SAFETY ON TOUCHDOWN



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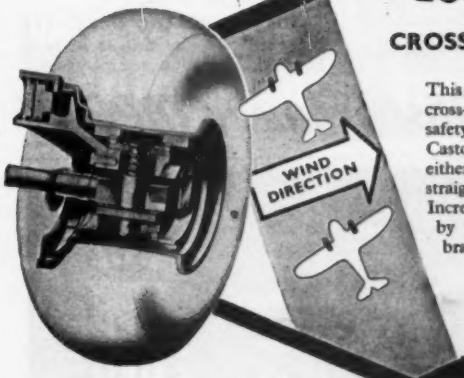

GOODYEAR
CROSS WIND LANDING GEAR

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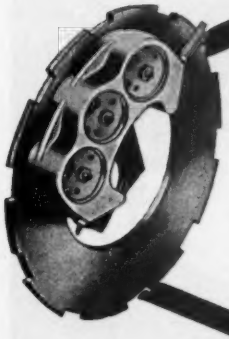

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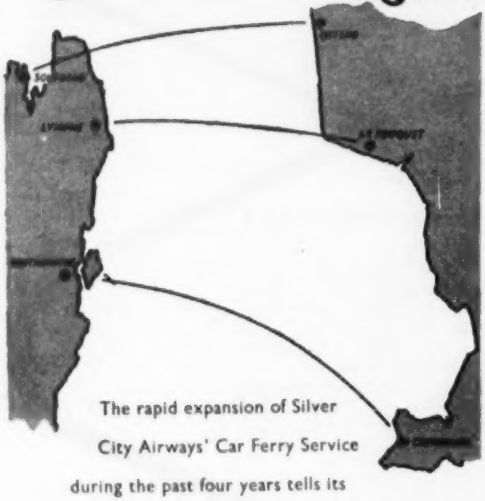

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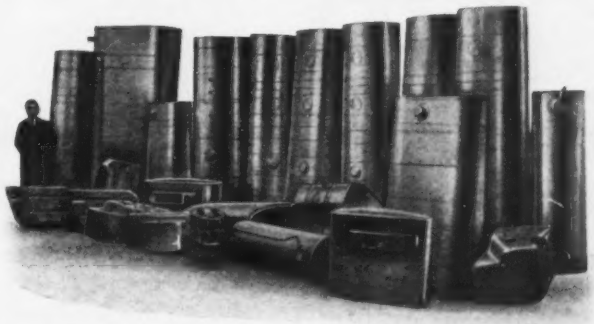

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NOTICE is hereby given that Canadian Patents & Development, Ltd., seek leave to amend the complete specification of the Application for Letters Patent No. 660083 for an invention entitled Blade Mounting for Axial-flow Compressors and the like.

PARTICULARS of the proposed amendments were set forth in the Official Journal (Patents), No. 3310, dated July 23rd, 1952.

ANY person may lve Notice of Opposition to the amendment by leavfig Patents Form No. 21 at the Patent Office, 25, Southampton Buildings, London, W.C.2, on or before August 21rd, 1952. J. L. Blake, Comptroller-General. [0407

THE proprietor of British Patent No. 628689, entitled "Insulating Pads" offers same for licence or otherwise to ensure practical working in Great Britain. Inquiries to Singer, Stern & Carlberg, 14 East Jackson Boulevard, Chicago 4, Illinois, U.S.A. [0463

THE proprietor of British Patent No. 629534, entitled "Improvements in and method of making insulating pads," offers same for licence or otherwise to ensure practical working in Great Britain.—Inquiries to Singer, Stern and Carlberg, 14 East Jackson Boulevard, Chicago 4, Illinois, U.S.A. [0462

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THE successful bidder will be responsible for the dismantling of the hangar and transportation of the materials arising therefrom, and will be required to deposit 25% of the purchase price before commencement of work, the balance being paid through an irrevocable letter of credit opened with a bank approved by the Company and available on completion of demolition.

INTERNAL offices, workshops, electrical fittings and the contents of the hangar are not included in this offer for sale.

FURTHER particulars of the hangar and authorizations to inspect it may be obtained from the General Manager. Tenders are receivable at the office of the General Manager, Pakistan Aviation, Ltd., Karachi Civil Airport, on or before September 15th, 1952. Tenders should be sent in sealed envelopes marked "R-101." [0442A

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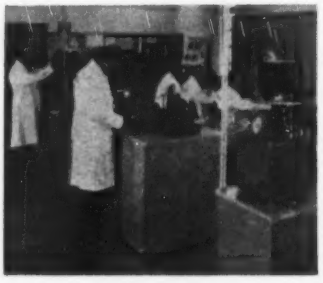

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WRITE to Secretary of the Admiralty (C.W.520), Queen Anne's Mansions, London, S.W.1. [0194

VICKERS-ARMSTRONGS, LTD. (Aircraft Section) have vacancies at Hurn Depot for the following staff:

AIRCRAFT STRESSMEN
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APPLY in writing to the Employment Manager, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge, Surrey.

APPLICATIONS, with certain exceptions, are subject to the approval of the Ministry of Labour and National Service. [9494

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DRAUGHTSMAN/Laboratory Assistant required. The appointment will be made in the Technician Grade (£278 x £18—£368), the initial salary being determined by qualifications and experience; there is a staff superannuation scheme. The duties of the post will be to prepare laboratory experiments and to assist in the design of new wind tunnel equipment. Applications (three copies), together with the names of three persons to whom reference may be made, should be sent to the Secretary and Registrar, The University, Southampton, not later than August 1st, 1952. [9485

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APPLICATIONS are invited for the appointment of lecturer or assistant lecturer tenable from October 1st, 1952. Experience, the study of aeroelasticity desirable. Salary scales: Lecturer, £550 x £50—£1,100; assistant lecturer £400 x £50—£500, plus children's allowance and F.S.S.U. benefits. Further particulars may be obtained from the Secretary and Registrar, The University, Southampton. [9486

HANDLEY PAGE, Ltd., have vacancies for:

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SENIOR design and intermediate draughtsmen, preferably with aircraft experience, for Cricklewood and Radlett offices. Consideration will be given to applicants with experience in light structural or mechanical engineering. Possession of O.N.C. or H.N.C. (Mech. or Elect.) an advantage.

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WANTED, A.C. and X. licensed aircraft engineers familiar with types of light aircraft for the West Midlands area. Apply, Box 1712. [9496

RADIO mechanic required preferably licensed. Apply, Chief Engineer, Eagle Aviation, Ltd., Luton Airport, Beds. [9493

AIRCREW leaving the Services. Be qualified before discharge. Obtain your M.C.A. licences through Avigation, Ltd., 30, Central Chambers, Ealing, W.5. Tel.: Ealing 6949. [0249

LICENSED radio engineer and radio mechanics at our base at Stansted Airport, Essex.—Apply by letter or telephone to the Senior Radio Engineer, Aviation Traders, Ltd., Southend Airport. Tel.: Rochford 2693. [0260

PORTSMOUTH AVIATION have vacancies for stressmen of all grades for super-priority work at Portsmouth and Hurn Airports.—Apply: The Airport, Portsmouth. [9151

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TECHNICAL WRITERS.

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APPLICATIONS are invited from senior and junior stressmen and draughtsmen for work on new designs. Applications should state age, experience, qualifications and salary expected.—Auster Aircraft, Ltd., Rearsby Aerodrome, Leics. [9308

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TECHNICAL assistant, 30-35, of British nationality required for interesting and varied work in heat exchange test laboratory. Apply in writing to Delaney Gallay, Ltd., Edgware Road, Cricklewood, London, N.W.2. [9485]

ELECTRICIANS and mechanics with experience of Link Flying Trainers required for outside servicing. Must be prepared to travel.—Suitable applicants should apply in writing to Personnel Officer, Air Trainers, Ltd., Bicester Road, Aylesbury, giving details of experience. [9502]

SENIOR weight estimator required for work on helicopters by Saunders-Roe, Ltd.—Applications, giving details of experience, should be addressed to the Personnel Officer, Saunders-Roe, Ltd., The Airport, Southampton. [9504]

ENGINEER with experience of the testing and maintenance of aircraft gyroscopic and servo equipment. Higher National Certificate standard of education.—Write fully, stating age, experience, to Box F.392, at 191, Gresham House, E.C.2. [9416]

BLACKBURN & GENERAL AIRCRAFT, Ltd., have vacancies at Brough for two loftsmen with experience on aircraft work.—Applications, giving particulars of age, training, experience, etc., to the Personnel Superintendent, Brough, E. Yorks. [9479]

WEST AFRICAN AIRWAYS CORPORATION. Applications are invited for the appointment of Chief Engineer which will be vacant later this year. The position will be on the permanent and pensionable staff in salary grade £1,700 by £50 to £1,900 according to age and qualifications.

FREE fully furnished quarters are provided and free passages to and from Lagos, Nigeria, for the officer and his wife and up to 2 children on first appointment and on leave. Liberal leave on full salary after tours of from 12 to 18 months. Age limit 26 to 45.

CANDIDATES should have had considerable administrative and workshop experience in a responsible position in the maintenance and overhaul of aircraft and engines. A degree or near qualifications in mechanical or aeronautical engineering, experience in the tropics and with De Havilland Dove and Bristol 170 aircraft are desirable additional qualifications.

FULL particulars and form of application may be obtained from the Corporation Agents in the U.K., Chief Personnel Officer, B.O.A.C., Great West Road, Brentford, Middlesex. [9512]

JIG and tool draughtsmen, fully experienced, required by Percival Aircraft, Ltd., Luton Airport, Beds. Good working conditions and full welfare facilities, including staff pension scheme—Applications to the Manager, Luton Employment Exchange, stating age, experience, salary required. [9490]

IMPORTANT Midlands gas-turbine aircraft-engine manufacturer has vacancies for a number of designers and senior and junior draughtsmen. Although experience is most advantageous, it is not necessarily essential as training will be given.—Apply in some detail, please, to Reference F101, Box 9660. [9516]

ASSISTANT chief storesman required by Percival Aircraft Ltd., Luton Airport Beds., Good welfare facilities, including staff pension scheme.—Applications giving full details of qualifications, experience, age and salary required, to the Manager, Ministry of Labour and National Service, Luton. [9529]

LOFTSMEN required; previous aircraft experience not essential. Apply Employment Manager, Vickers-Armstrongs, Ltd. (Aircraft Section), Weybridge, Surrey. —Applications, with certain exceptions, are subject to the approval of the Ministry of Labour and National Service. [9450]

WEIGHT estimator required by Percival Aircraft, Ltd., Luton Airport, Beds, for work on fixed wing and helicopter aircraft. Good welfare facilities, including staff pension scheme.—Apply, giving details of age, qualifications, experience and salary required, to Manager, Ministry of Labour and National Service, Luton, Beds. [9592]

H. M. HOBSON, Ltd., invite applications for positions in the drawing office as follows: designers, detail and modification draughtsmen, checkers, stressmen. The work is concerned with interesting projects connected with fuel metering equipment and hydraulic flying controls for aircraft.—Hobson Works, Fordhouses, Wolverhampton. [9428]

LANCASHIRE AIRCRAFT CORPORATION, Ltd., Bovingdon Airport, Herts, require qualified pilots, navigators and radio officers for their York fleet. Only applicants holding appropriate M.C.A. licences will be considered.—Please write full details to the Personnel Manager, at above address. [9524]

TECHNICAL assistants, experienced in dealing with electronic measurement and instrumentation, required for work on aero engines and their application. Candidates, aged between 25 and 30, possessing degree or diploma and willing to deal with problems during flight preferred.

APPLICATIONS, stating age, qualifications, and details of experience, should be addressed to the Divisional Personnel Manager, The Bristol Aeroplane Co., Ltd., Engine Division, Filton House, Bristol. [9509]

SENIOR design and intermediate draughtsmen with good experience of aircraft or light structural or mechanical engineering required for aircraft and armament project work at Portsmouth and Hurn offices.—Apply by letter to Portsmouth Aviation, Ltd., The Airport, Portsmouth. [9501]

ISRAEL AIRLINES, Ltd., require engineers with Constellation experience, air-frame and engines, to be based at Lydda. Good rate of pay; families can join after three months' probation. Applications in the first instance to be made to Station Manager, Israel Airlines, London Airport. [9481]

AIR SCHOOLS, Ltd., require a qualified flying instructor with a minimum B.I. category, also one ex-flying instructor qualified to instruct on applied flying subjects. Applications to be addressed to the Chief Instructor, Air Schools, Ltd., Derby Airport, Burnaston, nr. Derby, giving fullest particulars of experience. [9488]

ASSISTANT buyer required by large engineering company, London area. Applicant to be able to supervise section of department dealing with raw material and standard parts purchases. Previous experience essential. —Apply, in writing, giving full details of qualifications, past experience, salary earned age and education, to Box 1758. [9500]

PILOT with single- and twin-engine experience required by Aerial Survey Company. Applicants should have good educational background to enable to act as expedition manager when overseas, and deal with clients, etc. Current licences desirable but the right man would be given opportunity to obtain or renew licences. Age under 30 preferred.—Box 1773. [9509]

BROCKWORTH ENGINEERING Co., Ltd., Hucclecote (Gloucester (Branch of Hawker Siddeley Group, Ltd.), require for super priority work on aero engines a foreman to take charge of process work. Experience must include copper, cadmium, chromium, zinc and silver plating and, further, chromating, anodising find phosphate treatments and the application of protective treatments in general. APPLY in writing, giving full details of experience and salary required, to Personnel Manager. [9460]

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Previous aircraft experience an advantage but not essential

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TEST laboratory assistants (male) required by Percival Aircraft, Ltd., Luton Airport, Beds. Fully qualified to state standard and previous experience on design of test laboratory equipment desirable. Good welfare facilities, including staff pension scheme.—Applications, stating qualifications, experience, age and salary required, to Manager, Employment Exchange, Luton, Beds. [0384

TECHNICAL assistant. The Aircraft Design Technical Office of the Bristol Aeroplane Co., Ltd., have a vacancy for a junior or intermediate technical assistant in their engineering development laboratory. The work is concerned with the vibration testing of aircraft structures and mechanical systems on an interesting range of civil and military aircraft and helicopters.

CANDIDATES should possess a Higher National Certificate in Electrical engineering or equivalent qualification.

APPLICATIONS should be forwarded to the Ministry of Labour and National Service, 20, Nelson Street, Bristol, and marked for the attention of the Personnel Manager. The Bristol Aeroplane Co., Ltd., Aircraft Division, Filton House, Bristol. [0491

REQUIRED immediately by Percival Aircraft, Ltd., Luton Airport, Beds, several draughtsmen with comprehensive experience of engine installations and allied systems. Good welfare facilities, including staff pension scheme.—Applications, in writing, stating age, qualifications, experience and salary required, to the Labour Exchange Manager, Luton. [0511

CHRISTCHURCH, Hants. Senior designing draughtsman required experienced in power-plant installation. Must have jet installation design experience and capable of taking control of section under assistant designer. Saturday or Sunday interview can be arranged. Applications to Chief Draughtsman, The de Havilland Aircraft Co., Ltd., Airspeed Division, Christchurch. [0485

CHRISTCHURCH, Hants. Applications are invited for a position as chemist to undertake general chemical and instrumentation work associated with aircraft de-icing. Training should have reached the degree standard with bias towards organic. Applications to Personnel Manager, The de Havilland Aircraft Company, Ltd., Airspeed Division, Christchurch, Hants. [0469

APPLICATIONS are invited from senior and intermediate design draughtsmen. Experience of aeronautical design desirable, but not essential. Also checkers.—Please write, stating age and giving details of previous experience in chronological order, to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0350

ESTIMATORS (aircraft, male) required by Percival Aircraft, Ltd., Luton Airport, Beds. Fully conversant with general construction and preferably with previous experience in similar capacity. Good welfare facilities including staff pension scheme.—Applications, in writing, to the Manager, Employment Exchange, Luton, Beds., stating age, experience and salary required. [0473

CHIEF test engineer required by large firm, S.E. England, for aeronautical division, with good technical education to B.Sc. standard. Practical experience of production problems connected with electronic servos in the aircraft industry. Progressive post. Pension scheme. —Write fully, stating age, experience, to Box F.360, at 191, Gresham House, E.C.2. [0409

TWO engineers with experience of the testing and maintenance of airborne electronic equipment. For one post experience of servo-mechanisms would be an advantage. For the other, experience of radio transmitter-receivers. Applicants must have Higher National Certificate or write fully, stating age, experience, to Box F.360 at 191, Gresham House, E.C.2. [0417

DRAUGHTSMEN and stressmen with aircraft experience required for interesting and progressive work on new designs. Permanent positions at attractive salaries for capable applicants. Opportunities for cheap flying with firm's Flying Club. Housing arranged and assistance given. —Application to Chief Designer, Auster Aircraft, Ltd., Rearsby, Leicester, or through local Employment Exchange. [0389

APPLICATIONS are invited from design draughtsmen and stressmen, also technical assistants with combined design and performance experience for work on both reciprocating and gas turbine aero engines.—Applications should state full particulars of experience and qualifications and should be addressed to the Personnel Officer, The de Havilland Engine Co., Ltd., Stag Lane, Edgware, Middlesex. [0002

REQUIRED IMMEDIATELY BY WELL KNOWN AUTOMOBILE ENGINEERING FIRM IN NORTH WEST DISTRICT

Designers and Detail Draughtsmen, Jig and Tool Draughtsmen—also Planning Engineers

THESE VACANCIES OFFER GOOD CONDITIONS AND PROSPECTS TO SUITABLE APPLICANTS. SALARY ACCORDING TO AGE, EXPERIENCE AND QUALIFICATIONS

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SITUATIONS VACANT

AIR FORCE, Naval, civil and helicopter aircraft all under design and development at Percival Aircraft, Ltd., Luton Airport, Beds. Applications are invited from senior and junior draughtsmen and stressmen, for work on this interesting programme. Good welfare facilities, including staff pension scheme. Write, giving details of experience and salary required, to Manager, Ministry of Labour and National Service, Luton, Beds. [0384

WORKS manager required with considerable administrative and manufacturing experience on all-metal aircraft. Applicants must have held similar position for some years. Good prospects with excellent salary and pension scheme offered to successful applicant. Please give full particulars of previous appointments held, qualifications, age and salary required, to The Managing Director, Percival Aircraft Ltd., The Airport, Luton, Beds. [0462

NORMALAIR, Ltd., require for the London office a first-class design and detail draughtsmen, experienced in light mechanical precision engineering or instrument practice and with a background for aircraft pressurising and high-altitude breathing equipment. Good working conditions, and superannuation.—Apply, stating age, experience and salary required, to Employment Exchange (M.A.), Yeovil, Somerset. [0373

TECHNICIANS—aircraft. The Aircraft Design Technical Office of the Bristol Aeroplane Co., Ltd., requires the following personnel for work on an interesting range of civil and military aircraft and helicopters in their engineering development laboratory. Junior and intermediate technicians with Higher National Certificate and preferably some experience of structural or general engineering test work. These appointments offer excellent opportunities for advancement on merit.

APPLICATIONS should be sent to the Ministry of Labour and National Service, 20, Nelson Street, Bristol 1, and marked for the attention of the Personnel Manager, The Bristol Aeroplane Co., Ltd., Aircraft Division, Filton House, Bristol. [0375

SENIOR assistant required for the Aircraft Division of the English Electric Co., Ltd. to undertake duties associated with the administration of technical and design departments. Applicants should have orderly minds, and the ability to prepare concise progress reports and organise office administrative systems is essential. Higher National Certificate or Degree desirable, and several years' general experience in aircraft industry would be an advantage. Applicants with limited aircraft experience but fulfilling other requirements will be considered.—Please write giving full details and quoting reference 1071, to: Central Personnel Services, English Electric Company, Ltd., 24-30, Gillingham Street, London, S.W.1. [0498

AIRCRAFT SPRING WASHERS

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PROJECT ENGINEER to direct the work of a team engaged on projects relating to aircraft instruments and electronic equipment. Applicants should possess a University Degree or Higher National Certificate in Electrical Engineering or similar qualifications and have had experience in this type of work. Ref. E1

ASSISTANT ENGINEER for theoretical and experimental work on magnetic amplifiers. Qualifications such as degree in Physics or Electrical Engineering or Higher National Certificate are required. Previous experience in this field of work would be an advantage. Ref. E2.

ASSISTANT ENGINEER for theoretical and experimental work on problems of aircraft fuel contents gauging. Qualifications similar to post above are required. Ref E3.

TECHNICAL ASSISTANT to assist in development work on magnetic amplifiers and electrical instruments. For this previous experience is not essential but preferred qualifications would be an Engineering degree or Higher National Certificate in Electrical Engineering. Ref. E4.

TECHNICAL WRITER for preparation of installation, maintenance, and overhaul manuals and other publications. Experience of aircraft installations and electrical equipment is essential. Some previous experience in this type of work would be an advantage. Ref. E5.

DRAUGHTSMEN, senior and junior, for work on aircraft instruments, magnetic amplifiers and electronic equipment. Minimum qualifications Ordinary National in Mechanical or Electrical Engineering. A knowledge of later Service requirements and current design practice is required for the senior post. Ref. E6.

INSTALLATION ENGINEER to assist in installation aspects of fuel contents gauges and generally work with other engineers on calibration and field work on similar equipment. Applicants should have a knowledge of aircraft installations and accessories and preferably some previous experience in this type of work. Ref. E7.

Applications should be made in writing, quoting the reference of the vacancy, and giving details of qualifications and experience to the **Chief Development Engineer, Waymouth Gauges & Instruments, Ltd., Station Road, Godalming, Surrey.**

SITUATIONS VACANT

PLANNING engineer (aircraft) required by Percival Aircraft, Ltd., Luton Airport, Beds. Considerable practical experience of all aspects of metal airframe components and production planning essential qualifications. Good welfare facilities including staff pension scheme.—Apply to the Manager, Employment Exchange, Luton, giving full details of age, qualifications, experience and salary required. [0478

AIRCRAFT draughtsmen are required by the English Electric Co., Ltd., at Warton Aerodrome, near Blackpool. There are a number of vacancies for men having good aircraft drawing-office background. Good salaries will be paid according to age, qualifications and experience.—Write, giving full details and qualifications, and quoting reference "English Electric 120M," to 9 estminster Employment Exchange, Chadwick Street, London, S.W.1. [0468

THE R.A.F. Reserves Club, Ltd., 14, South Street, W.1, invite applications for the position of resident secretary. Applicants, who should be former R.A.F. officers with first-class executive ability and hotel experience, must be prepared to shoulder a very heavy amount of work during the next five years of expansion. Commencing remuneration will be modest but sufficient. Only written applications will be considered addressed to the Chairman. [0480

BRITISH OVERSEAS AIRWAYS CORPORATION have vacancies for pilots who have obtained Commercial Pilot's First Class with Instrument Rating and Radio Telephony licence. Preference will be given to applicants below the age of 27 years, but consideration will be given to suitably qualified applicants up to 32 years of age. Commencing salary dependent upon qualifications—£815 p.a. to £935 p.a.—Applications should be made in writing to the Chief Personnel Officer, B.O.A.C., Airways House, Great West Road, Brentford, Midds. [0500

THE expansion of the English Electric Group of Companies has created vacancies for men with suitable works background and academic qualifications to solve production problems by the efficient utilisation of the most modern machine tools and methods. Consequently applications are invited from senior and junior production and methods planning engineers. Please write, giving full details of experience and qualifications, quoting reference S.A.24, to Central Personnel Services, English Electric Co., Ltd., 24-30, Gillingham Street, London, S.W.1. [0491

A SENIOR engineer is required to direct the work of a team concerned with the development of ignition equipment for reciprocating and turbine engines. Candidates should have a flair for this kind of work and those preferred will be qualified electrical engineers who have had practical experience with all types of engines and can show evidence of expert knowledge and inventiveness in the ignition field.—Applicants should write quoting reference CE.1, giving full particulars of their training and experience and indicating salary expected to Box 1757, [0506

BRITISH EUROPEAN AIRWAYS have vacancies for planner/ratefixers at Renfrew, to cover the following departments: (1) manufacture of components and sub assemblies in the detail shop; (2) aircraft repair and maintenance. Applicants should preferably have served a five years' apprenticeship in engineering and have had several years' experience in planning and ratefixing in either of the above shops. Salary scale £11 4s. by 7s. 6d. to £13 1s. 6d. per week.—Applications, in writing, to Base Personnel Officer, British European Airways, Airport for Glasgow, Renfrew. [0505

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